FIG. 1

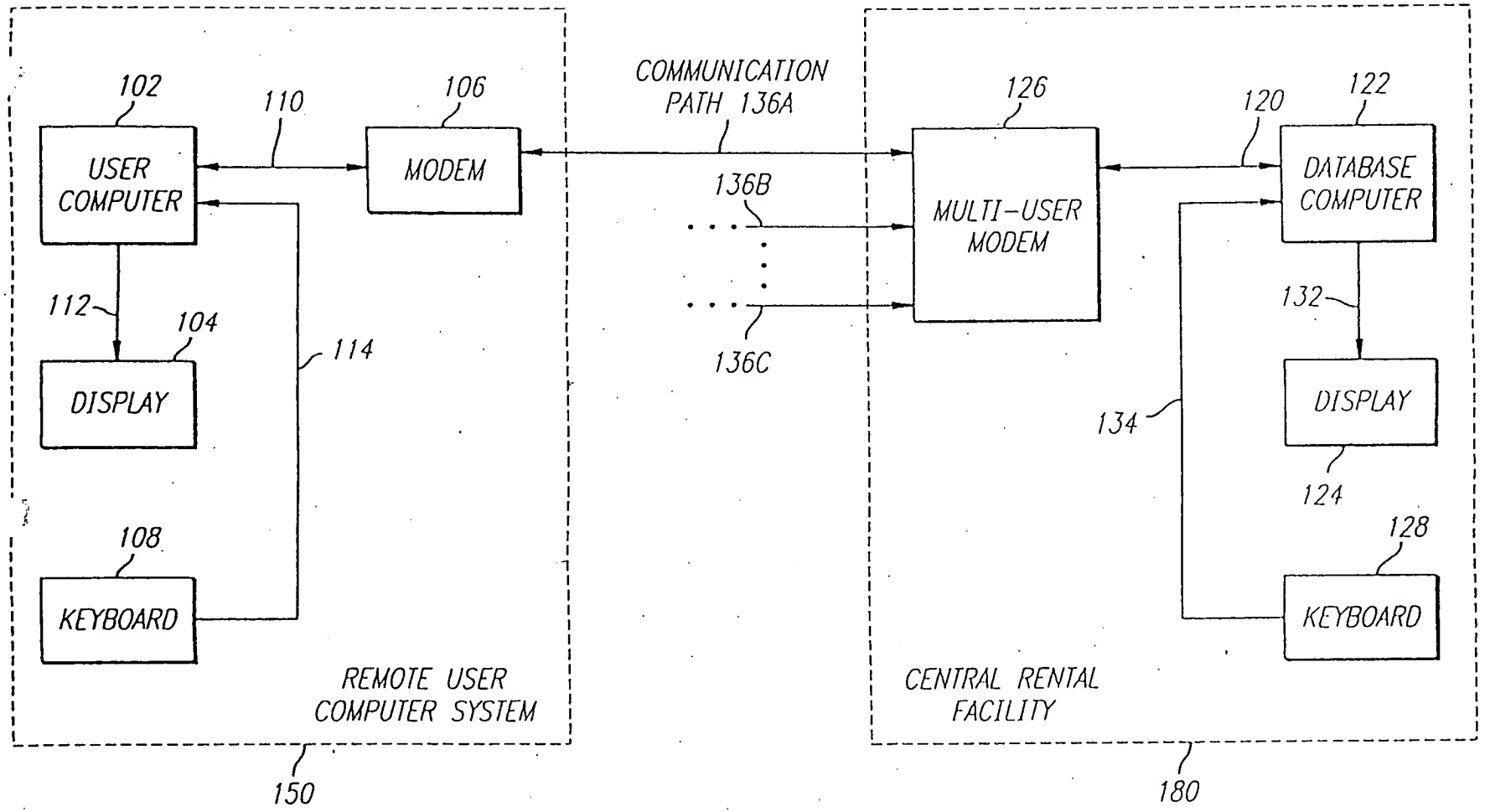
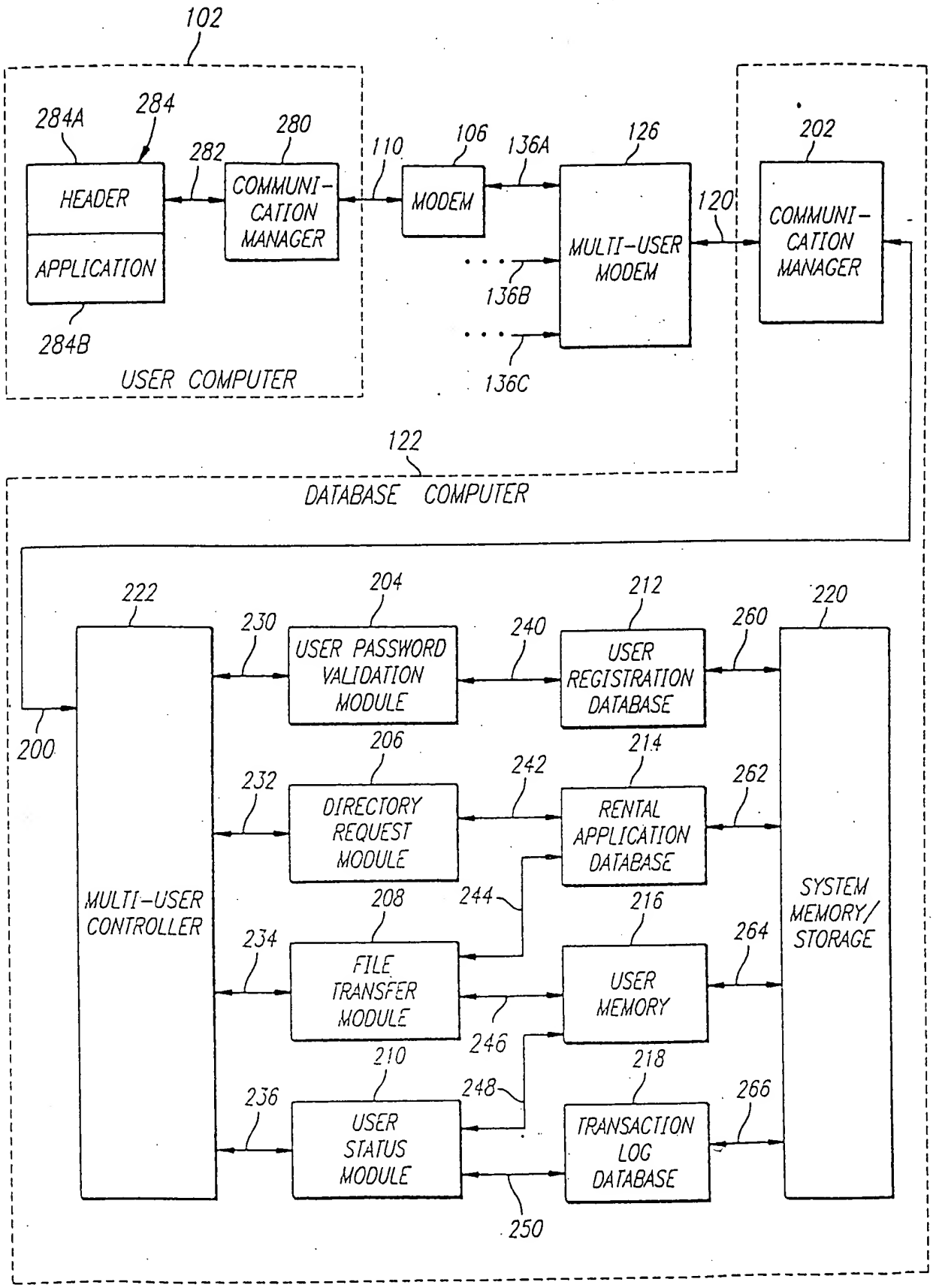

102
110
106
COMMUNICATION PATH 136A
126
120
122
USER COMPUTER
MODEM
136B
MULTI-USER MODEM
DATABASE COMPUTER
112
104
114
132
DISPLAY
134
DISPLAY
124
108
128
KEYBOARD
KEYBOARD
136C
REMOTE USER COMPUTER SYSTEM
CENTRAL RENTAL FACILITY
150
180

FIG. 2


102
284A
284
282
280
HEADER
APPLICATION
COMMUNI-CATION MANAGER
284B
USER COMPUTER
110
106
MODEM
136A
126
MULTI-USER MODEM
136B
136C
120
202
COMMUNI-CATION MANAGER
122
DATABASE COMPUTER
222
200
MULTI-USER CONTROLLER
230
204
USER PASSWORD VALIDATION MODULE
240
212
USER REGISTRATION DATABASE
260
220
232
206
DIRECTORY REQUEST MODULE
242
214
RENTAL APPLICATION DATABASE
262
234
208
FILE TRANSFER MODULE
244
216
USER MEMORY
264
SYSTEM MEMORY/ STORAGE
246
236
210
USER STATUS MODULE
248
218
TRANSACTION LOG DATABASE
266
250

002260 "Tens9560

FIG. 3

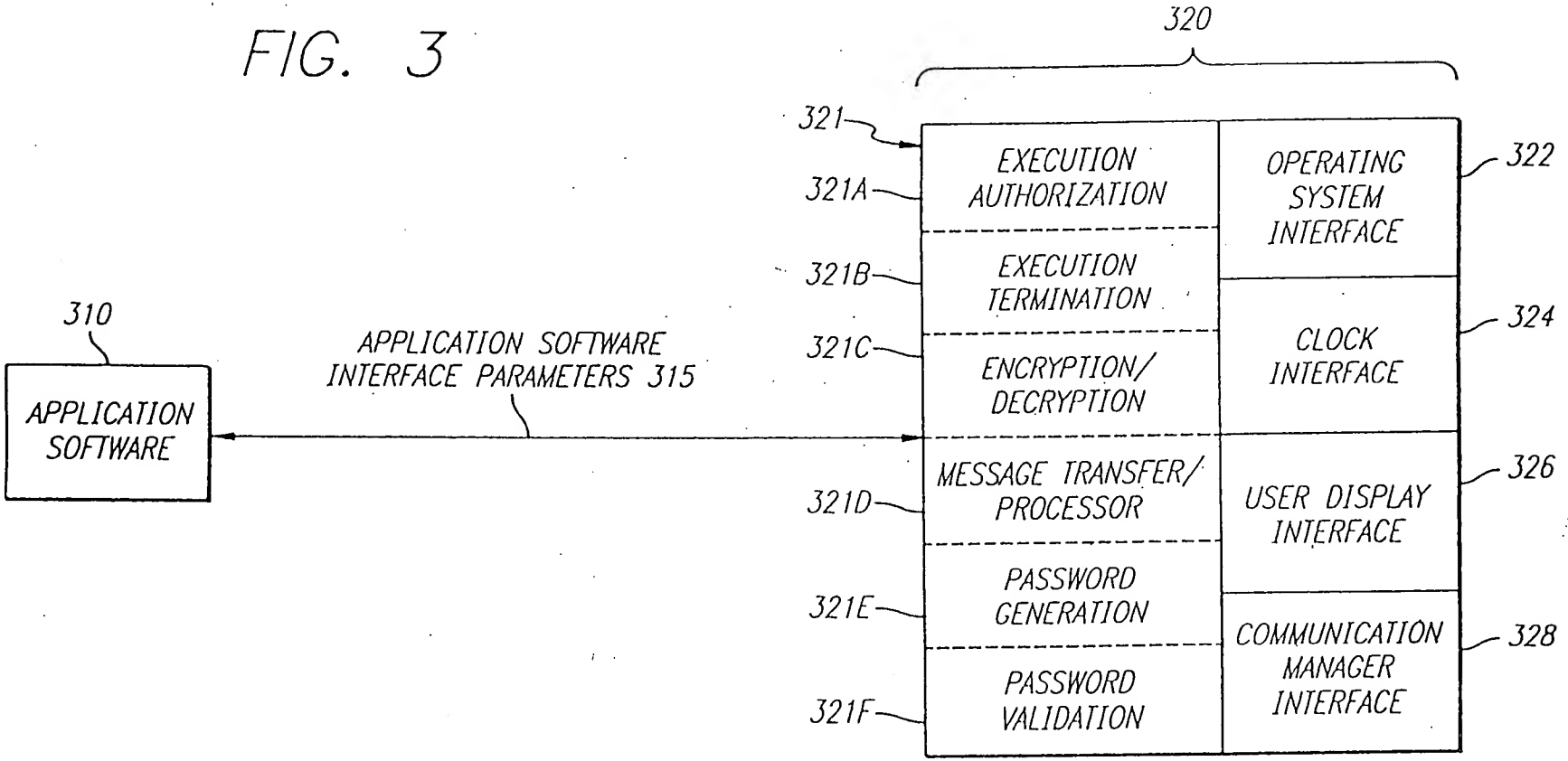
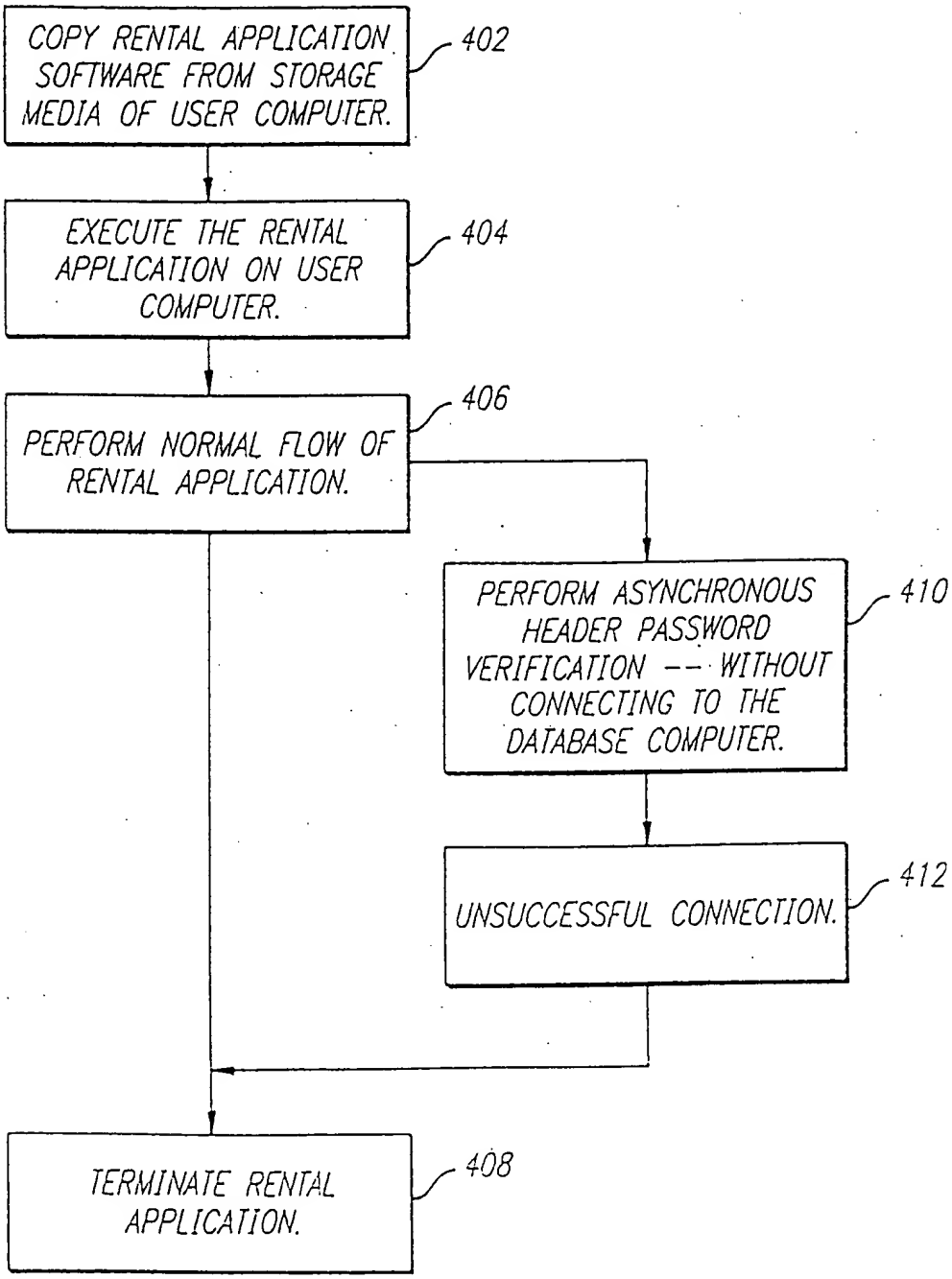


FIG. 4


COPY RENTAL APPLICATION SOFTWARE FROM STORAGE MEDIA OF USER COMPUTER.
402
EXECUTE THE RENTAL APPLICATION ON USER COMPUTER.
404
PERFORM NORMAL FLOW OF RENTAL APPLICATION.
406
PERFORM ASYNCHRONOUS HEADER PASSWORD VERIFICATION -- WITHOUT CONNECTING TO THE DATABASE COMPUTER.
410
UNSUCCESSFUL CONNECTION.
412
TERMINATE RENTAL APPLICATION.
408

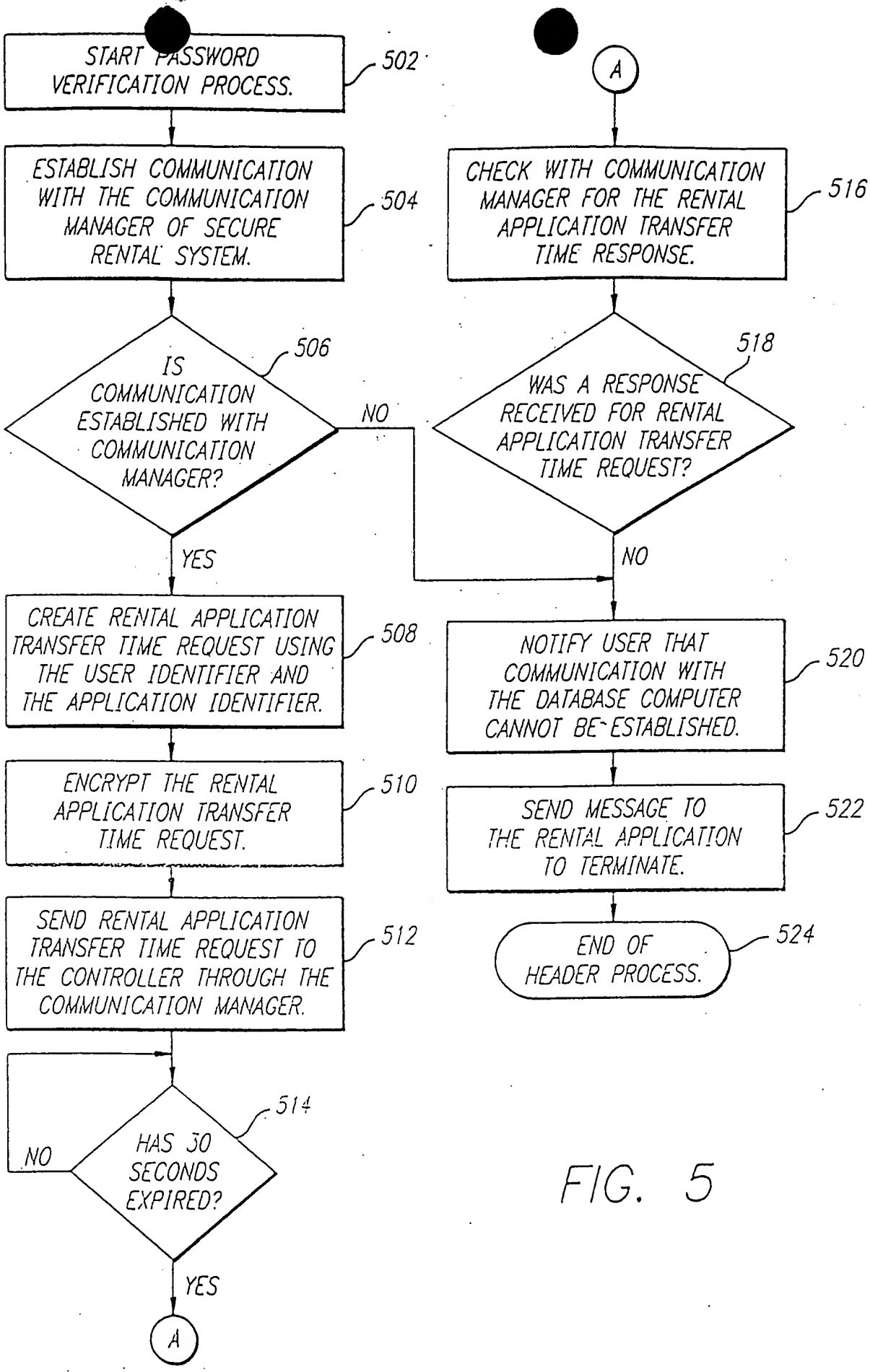

START PASSWORD VERIFICATION PROCESS.
502
ESTABLISH COMMUNICATION WITH THE COMMUNICATION MANAGER OF SECURE RENTAL SYSTEM.
504
IS COMMUNICATION ESTABLISHED WITH COMMUNICATION MANAGER?
506
NO
YES
CREATE RENTAL APPLICATION TRANSFER TIME REQUEST USING THE USER IDENTIFIER AND THE APPLICATION IDENTIFIER.
508
ENCRYPT THE RENTAL APPLICATION TRANSFER TIME REQUEST.
510
SEND RENTAL APPLICATION TRANSFER TIME REQUEST TO THE CONTROLLER THROUGH THE COMMUNICATION MANAGER.
512
HAS 30 SECONDS EXPIRED?
514
NO
YES
A
A
CHECK WITH COMMUNICATION MANAGER FOR THE RENTAL APPLICATION TRANSFER TIME RESPONSE.
516
WAS A RESPONSE RECEIVED FOR RENTAL APPLICATION TRANSFER TIME REQUEST?
518
NO
NOTIFY USER THAT COMMUNICATION WITH THE DATABASE COMPUTER CANNOT BE ESTABLISHED.
520
SEND MESSAGE TO THE RENTAL APPLICATION TO TERMINATE.
522
END OF HEADER PROCESS.
524

FIG. 5

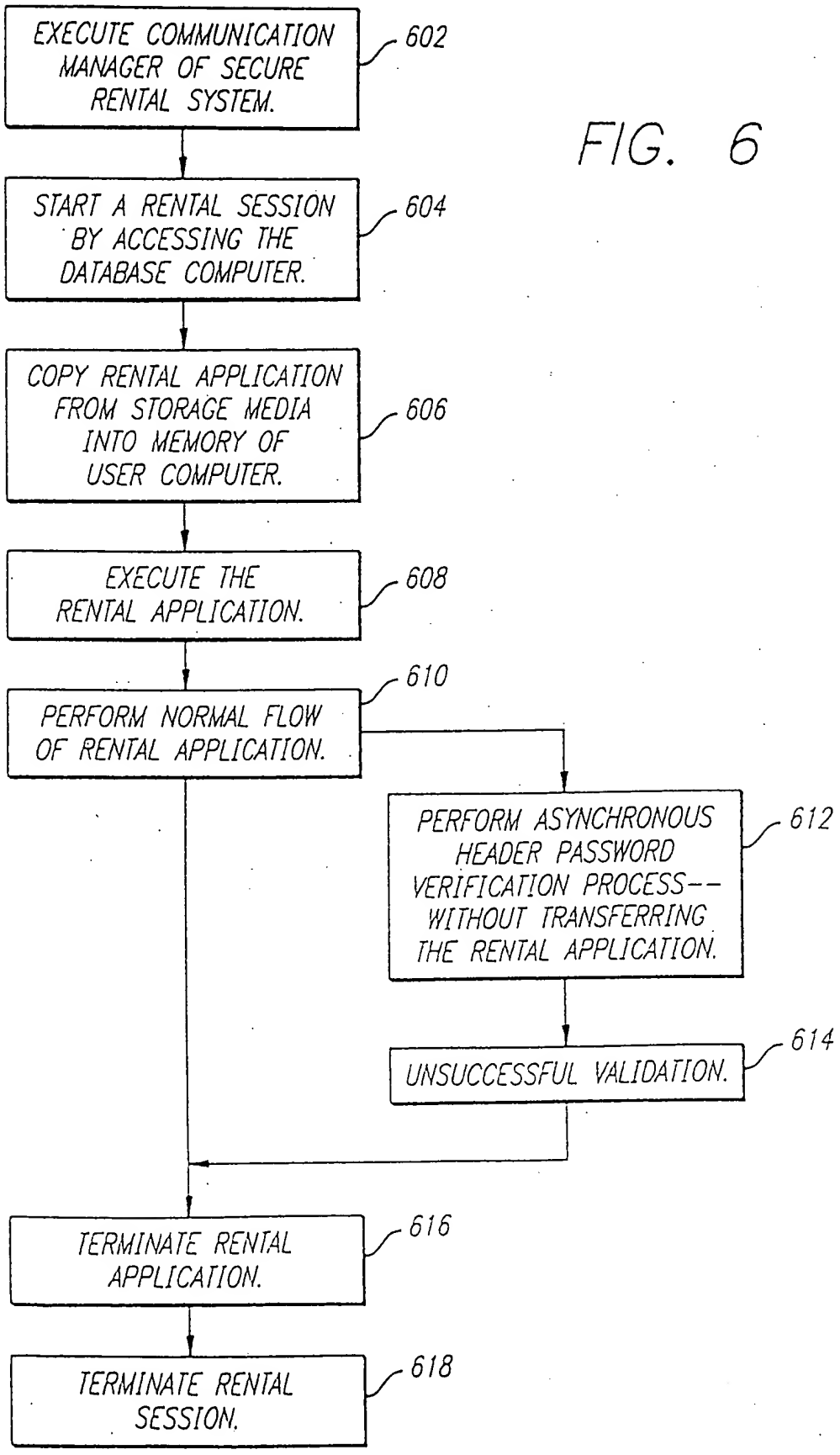

EXECUTE COMMUNICATION MANAGER OF SECURE RENTAL SYSTEM.
602
START A RENTAL SESSION BY ACCESSING THE DATABASE COMPUTER.
604
COPY RENTAL APPLICATION FROM STORAGE MEDIA INTO MEMORY OF USER COMPUTER.
606
EXECUTE THE RENTAL APPLICATION.
608
PERFORM NORMAL FLOW OF RENTAL APPLICATION.
610
PERFORM ASYNCHRONOUS HEADER PASSWORD VERIFICATION PROCESS-- WITHOUT TRANSFERRING THE RENTAL APPLICATION.
612
UNSUCCESSFUL VALIDATION.
614
TERMINATE RENTAL APPLICATION.
616
TERMINATE RENTAL SESSION.
618

FIG. 6

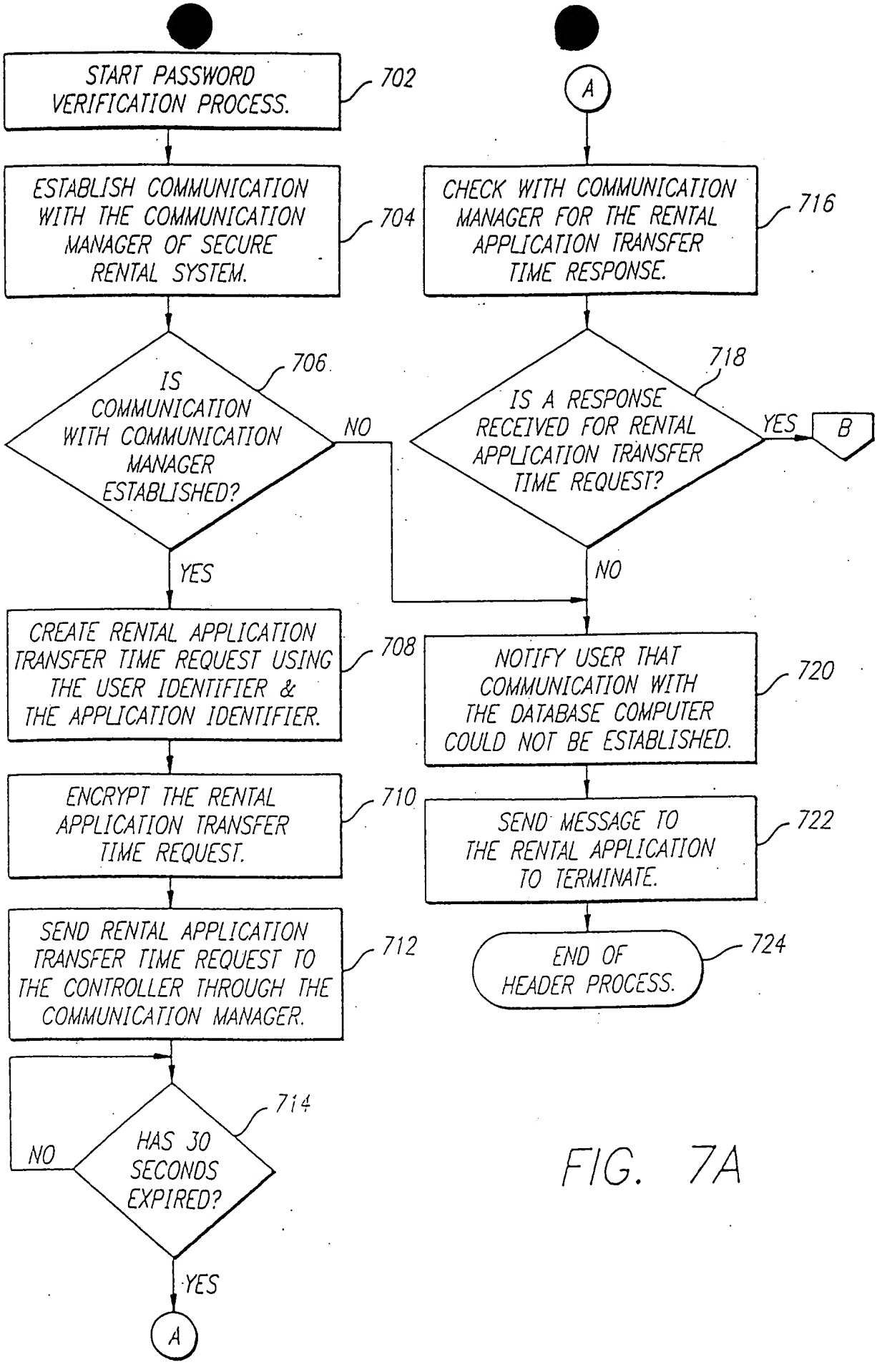

START PASSWORD VERIFICATION PROCESS.
702
ESTABLISH COMMUNICATION WITH THE COMMUNICATION MANAGER OF SECURE RENTAL SYSTEM.
704
IS COMMUNICATION WITH COMMUNICATION MANAGER ESTABLISHED?
706
NO
YES
CREATE RENTAL APPLICATION TRANSFER TIME REQUEST USING THE USER IDENTIFIER & THE APPLICATION IDENTIFIER.
708
ENCRYPT THE RENTAL APPLICATION TRANSFER TIME REQUEST.
710
SEND RENTAL APPLICATION TRANSFER TIME REQUEST TO THE CONTROLLER THROUGH THE COMMUNICATION MANAGER.
712
HAS 30 SECONDS EXPIRED?
714
NO
YES
A
A
CHECK WITH COMMUNICATION MANAGER FOR THE RENTAL APPLICATION TRANSFER TIME RESPONSE.
716
IS A RESPONSE RECEIVED FOR RENTAL APPLICATION TRANSFER TIME REQUEST?
718
YES
B
NO
NOTIFY USER THAT COMMUNICATION WITH THE DATABASE COMPUTER COULD NOT BE ESTABLISHED.
720
SEND MESSAGE TO THE RENTAL APPLICATION TO TERMINATE.
722
END OF HEADER PROCESS.
724

FIG. 7A

FIG. 7B

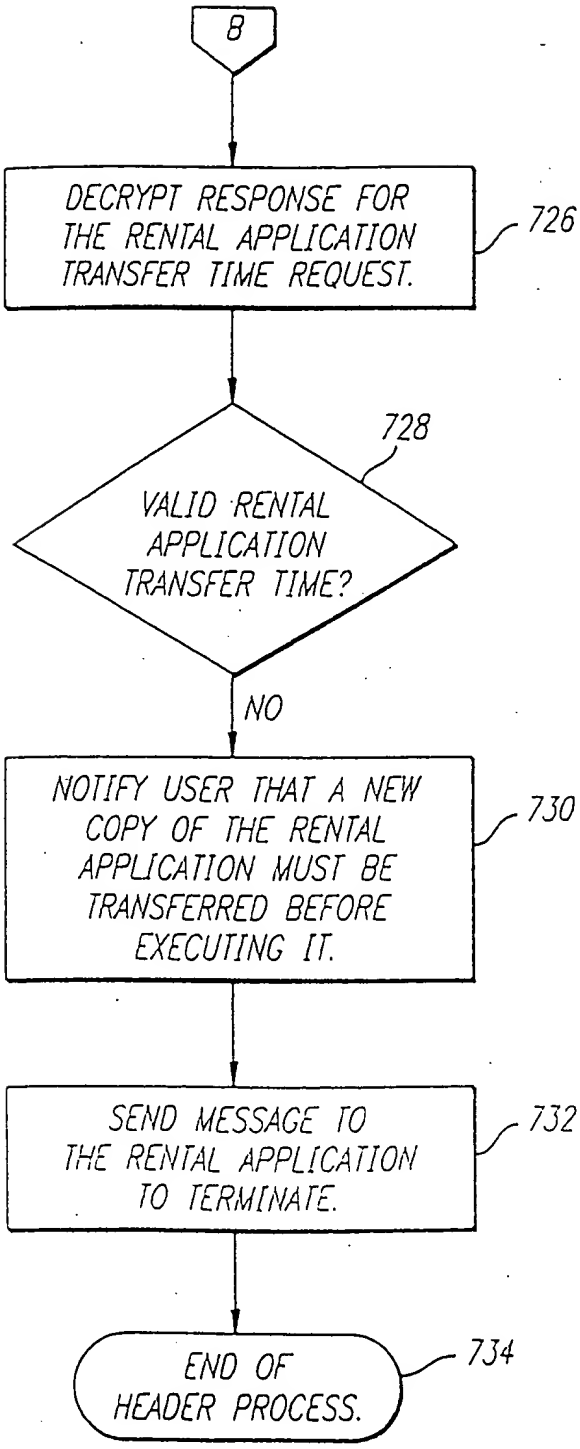

8
DECRYPT RESPONSE FOR THE RENTAL APPLICATION TRANSFER TIME REQUEST.
726
VALID RENTAL APPLICATION TRANSFER TIME?
728
NO
NOTIFY USER THAT A NEW COPY OF THE RENTAL APPLICATION MUST BE TRANSFERRED BEFORE EXECUTING IT.
730
SEND MESSAGE TO THE RENTAL APPLICATION TO TERMINATE.
732
END OF HEADER PROCESS.
734

FIG. 8

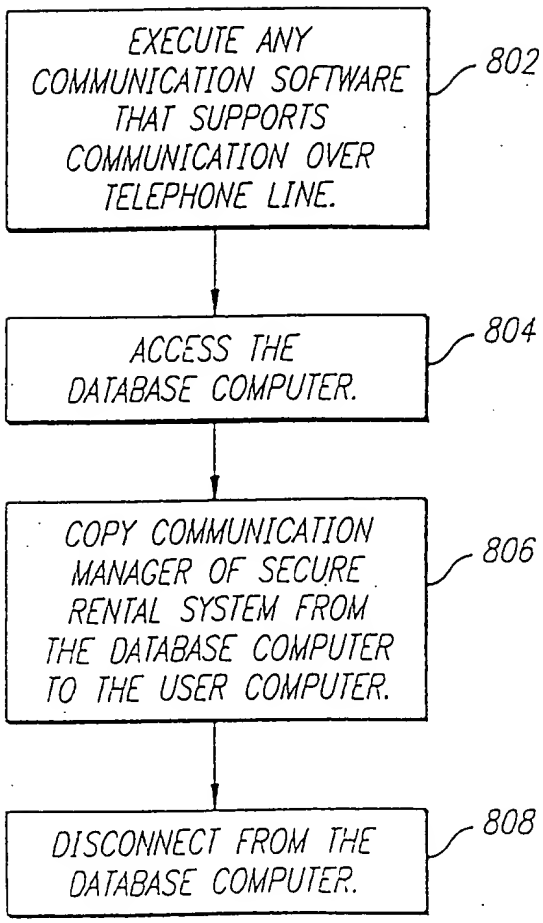
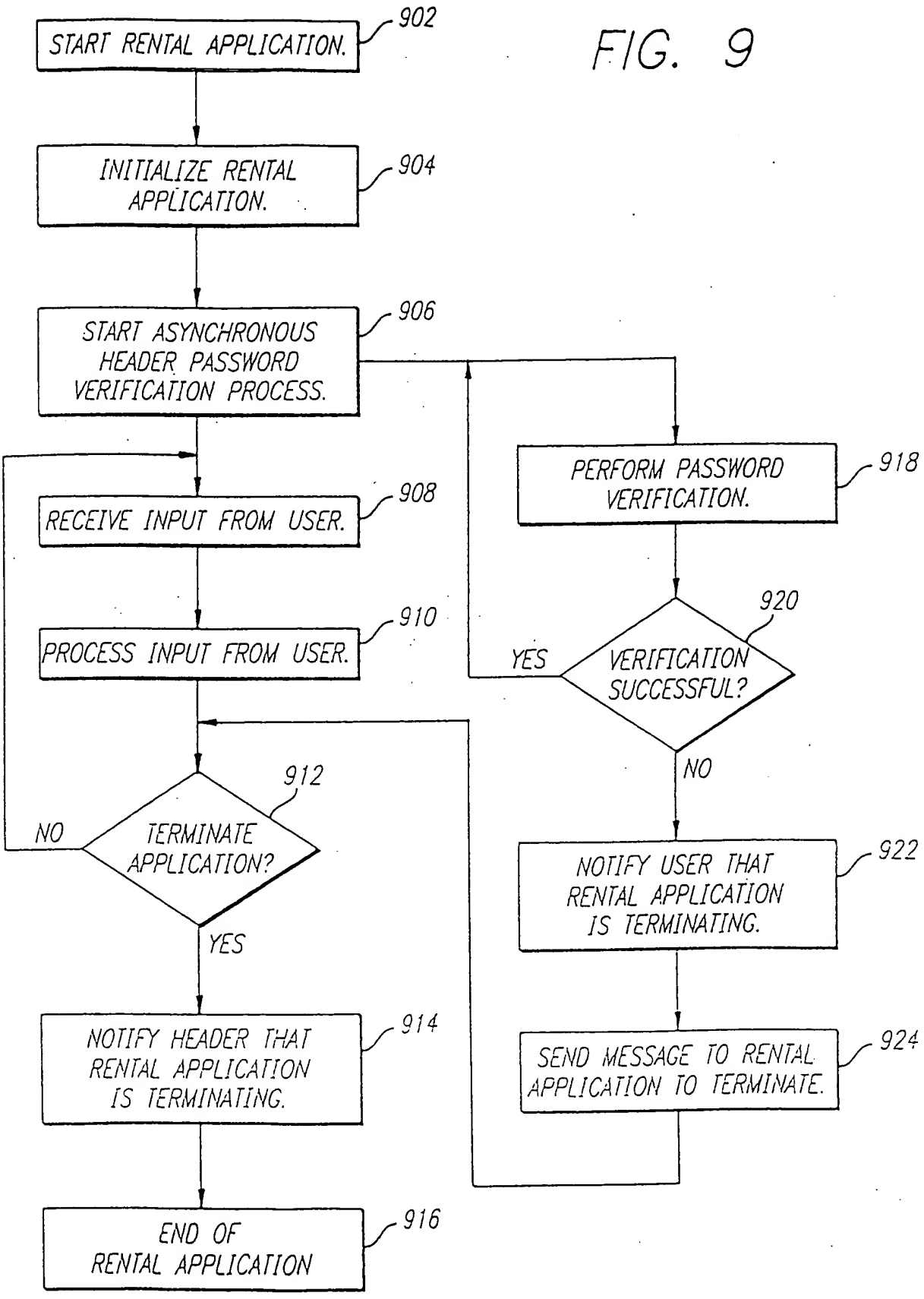

EXECUTE ANY COMMUNICATION SOFTWARE THAT SUPPORTS COMMUNICATION OVER TELEPHONE LINE.
802
ACCESS THE DATABASE COMPUTER.
804
COPY COMMUNICATION MANAGER OF SECURE RENTAL SYSTEM FROM THE DATABASE COMPUTER TO THE USER COMPUTER.
806
DISCONNECT FROM THE DATABASE COMPUTER.
808

FIG. 9


START RENTAL APPLICATION.
902
INITIALIZE RENTAL APPLICATION.
904
START ASYNCHRONOUS HEADER PASSWORD VERIFICATION PROCESS.
906
RECEIVE INPUT FROM USER.
908
PROCESS INPUT FROM USER.
910
TERMINATE APPLICATION?
912
NO
YES
NOTIFY HEADER THAT RENTAL APPLICATION IS TERMINATING.
914
END OF RENTAL APPLICATION
916
PERFORM PASSWORD VERIFICATION.
918
VERIFICATION SUCCESSFUL?
920
YES
NO
NOTIFY USER THAT RENTAL APPLICATION IS TERMINATING.
922
SEND MESSAGE TO RENTAL APPLICATION TO TERMINATE.
924

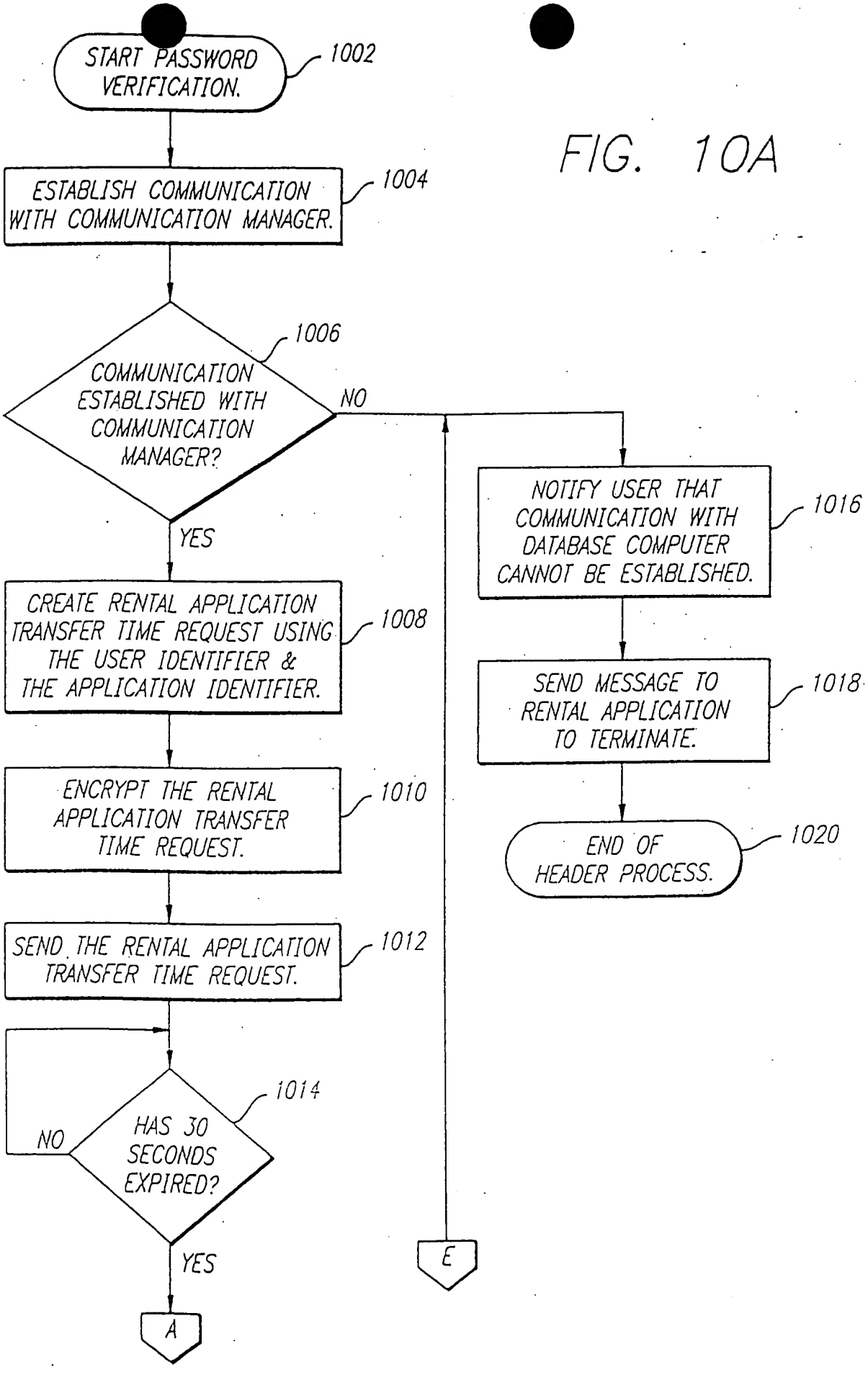

START PASSWORD VERIFICATION.
1002
ESTABLISH COMMUNICATION WITH COMMUNICATION MANAGER.
1004
COMMUNICATION ESTABLISHED WITH COMMUNICATION MANAGER?
1006
NO
YES
CREATE RENTAL APPLICATION TRANSFER TIME REQUEST USING THE USER IDENTIFIER & THE APPLICATION IDENTIFIER.
1008
ENCRYPT THE RENTAL APPLICATION TRANSFER TIME REQUEST.
1010
SEND THE RENTAL APPLICATION TRANSFER TIME REQUEST.
1012
HAS 30 SECONDS EXPIRED?
1014
NO
YES
A
E
NOTIFY USER THAT COMMUNICATION WITH DATABASE COMPUTER CANNOT BE ESTABLISHED.
1016
SEND MESSAGE TO RENTAL APPLICATION TO TERMINATE.
1018
END OF HEADER PROCESS.
1020

FIG. 10A

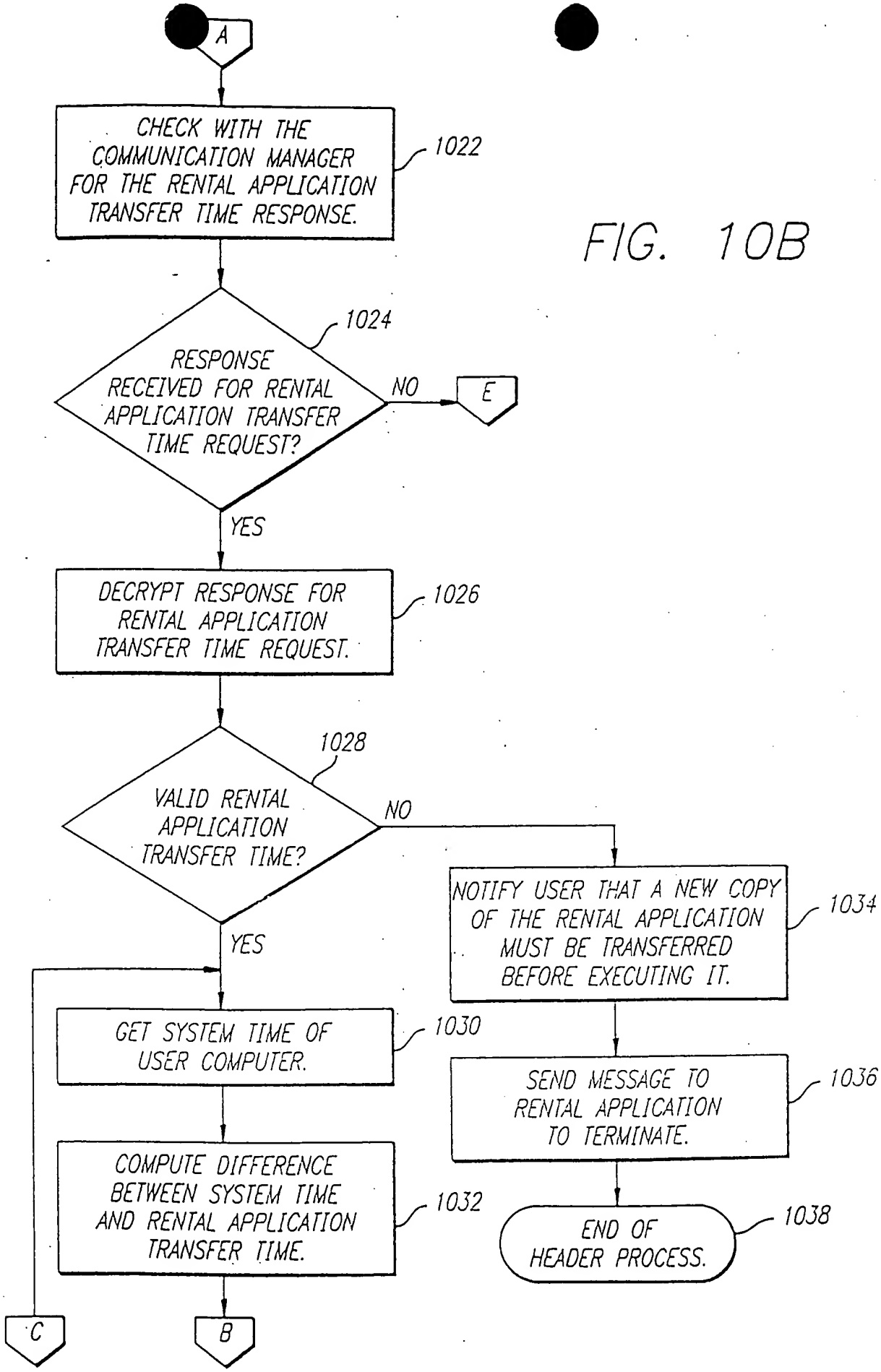

A
CHECK WITH THE COMMUNICATION MANAGER FOR THE RENTAL APPLICATION TRANSFER TIME RESPONSE.
1022
RESPONSE RECEIVED FOR RENTAL APPLICATION TRANSFER TIME REQUEST?
1024
NO
E
YES
DECRYPT RESPONSE FOR RENTAL APPLICATION TRANSFER TIME REQUEST.
1026
VALID RENTAL APPLICATION TRANSFER TIME?
1028
NO
YES
NOTIFY USER THAT A NEW COPY OF THE RENTAL APPLICATION MUST BE TRANSFERRED BEFORE EXECUTING IT.
1034
GET SYSTEM TIME OF USER COMPUTER.
1030
SEND MESSAGE TO RENTAL APPLICATION TO TERMINATE.
1036
COMPUTE DIFFERENCE BETWEEN SYSTEM TIME AND RENTAL APPLICATION TRANSFER TIME.
1032
END OF HEADER PROCESS.
1038
C
B

FIG. 10B

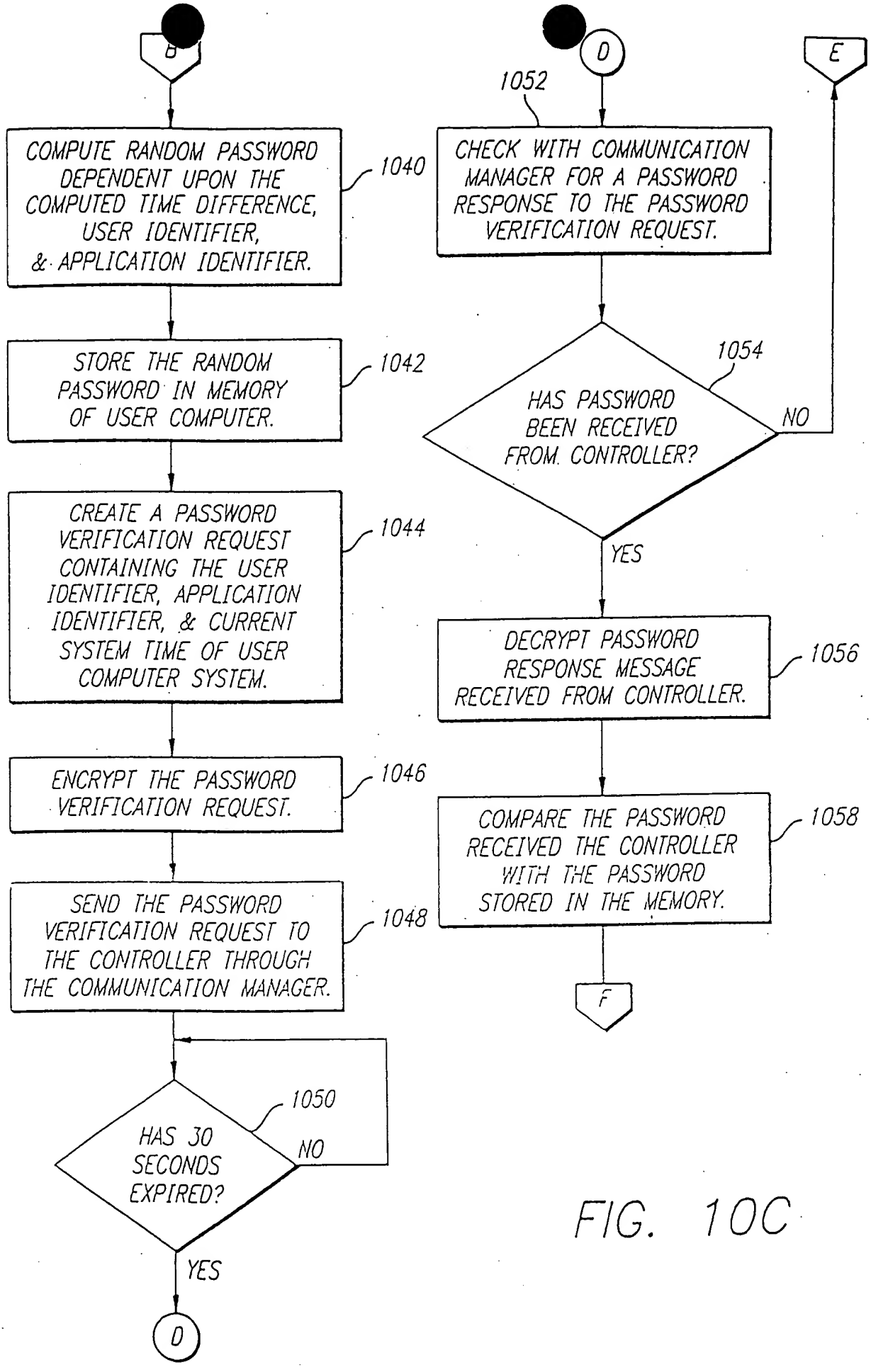

B
COMPUTE RANDOM PASSWORD DEPENDENT UPON THE COMPUTED TIME DIFFERENCE, USER IDENTIFIER, & APPLICATION IDENTIFIER.
1040
STORE THE RANDOM PASSWORD IN MEMORY OF USER COMPUTER.
1042
CREATE A PASSWORD VERIFICATION REQUEST CONTAINING THE USER IDENTIFIER, APPLICATION IDENTIFIER, & CURRENT SYSTEM TIME OF USER COMPUTER SYSTEM.
1044
ENCRYPT THE PASSWORD VERIFICATION REQUEST.
1046
SEND THE PASSWORD VERIFICATION REQUEST TO THE CONTROLLER THROUGH THE COMMUNICATION MANAGER.
1048
HAS 30 SECONDS EXPIRED?
1050
NO
YES
D
D
1052
CHECK WITH COMMUNICATION MANAGER FOR A PASSWORD RESPONSE TO THE PASSWORD VERIFICATION REQUEST.
HAS PASSWORD BEEN RECEIVED FROM. CONTROLLER?
1054
NO
YES
E
DECRYPT PASSWORD RESPONSE MESSAGE RECEIVED FROM CONTROLLER.
1056
COMPARE THE PASSWORD RECEIVED THE CONTROLLER WITH THE PASSWORD STORED IN THE MEMORY.
1058
F

FIG. 10C

FIG. 10D

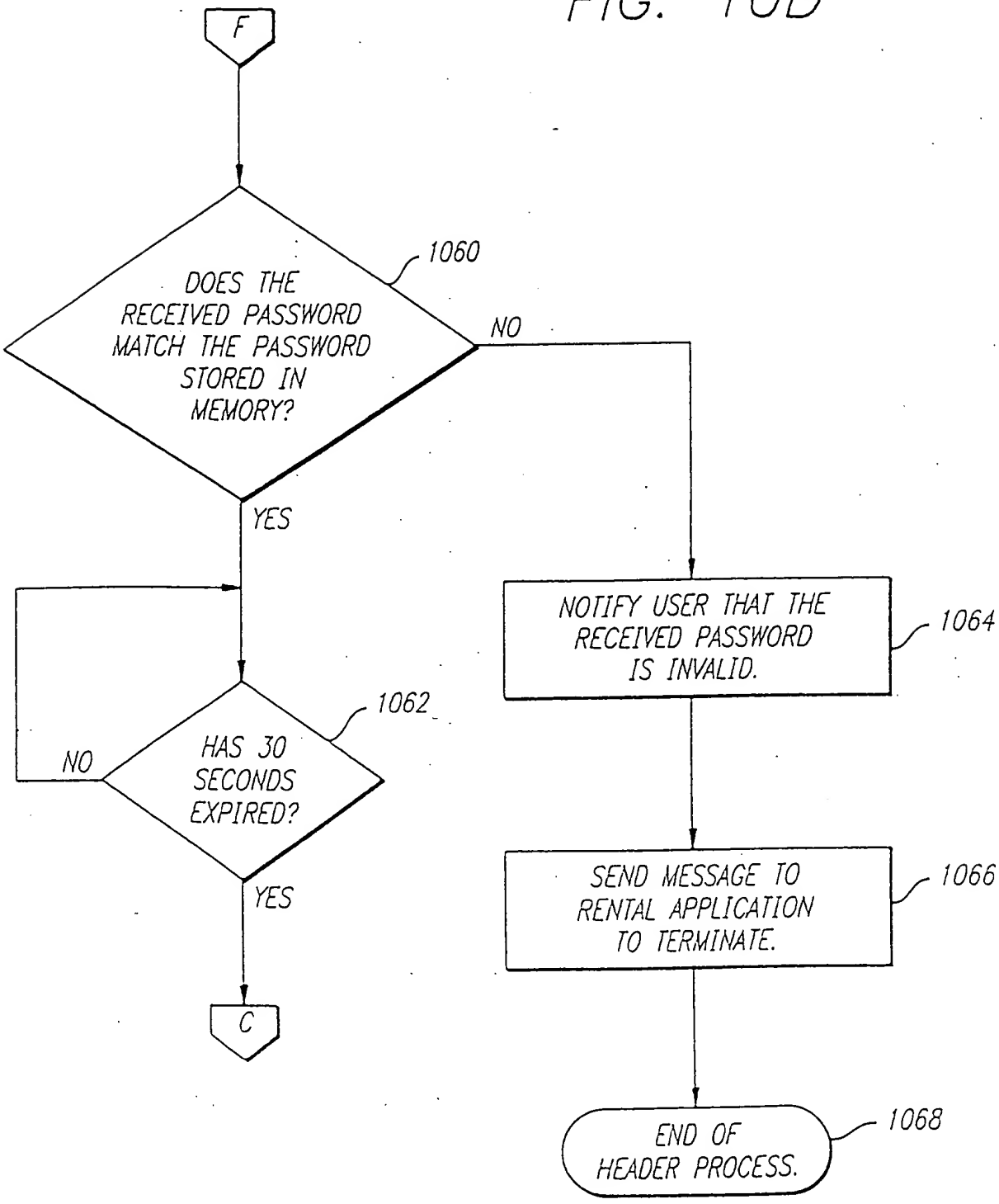
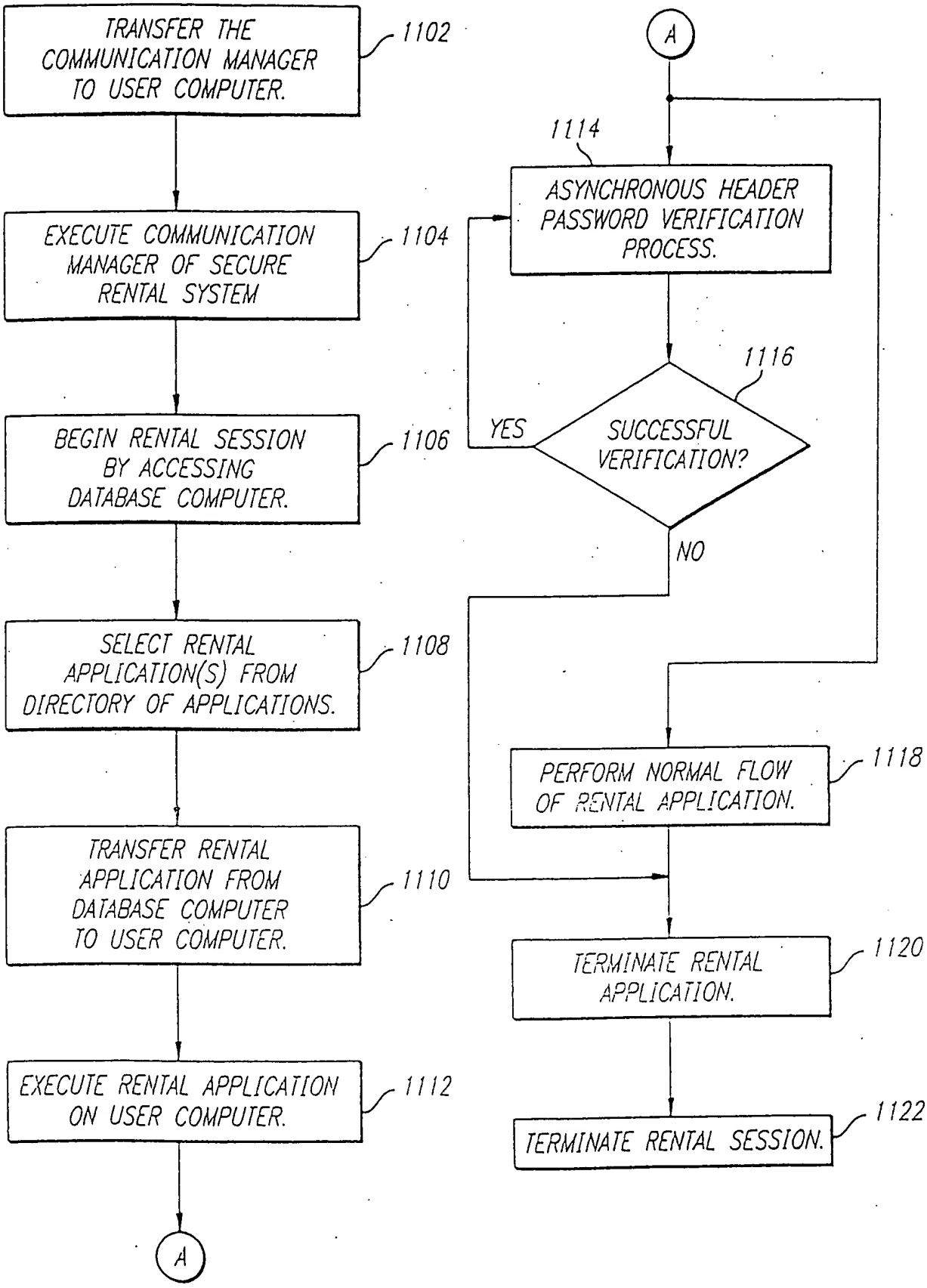

F
DOES THE RECEIVED PASSWORD MATCH THE PASSWORD STORED IN MEMORY?
1060
NO
YES
NOTIFY USER THAT THE RECEIVED PASSWORD IS INVALID.
1064
HAS 30 SECONDS EXPIRED?
1062
NO
YES
SEND MESSAGE TO RENTAL APPLICATION TO TERMINATE.
1066
C
END OF HEADER PROCESS.
1068

FIG. 11


TRANSFER THE COMMUNICATION MANAGER TO USER COMPUTER.
1102
EXECUTE COMMUNICATION MANAGER OF SECURE RENTAL SYSTEM
1104
BEGIN RENTAL SESSION BY ACCESSING DATABASE COMPUTER.
1106
SELECT RENTAL APPLICATION(S) FROM DIRECTORY OF APPLICATIONS.
1108
TRANSFER RENTAL APPLICATION FROM DATABASE COMPUTER TO USER COMPUTER.
1110
EXECUTE RENTAL APPLICATION ON USER COMPUTER.
1112
A
A
1114
ASYNCHRONOUS HEADER PASSWORD VERIFICATION PROCESS.
1116
SUCCESSFUL VERIFICATION?
YES
NO
PERFORM NORMAL FLOW OF RENTAL APPLICATION.
1118
TERMINATE RENTAL APPLICATION.
1120
TERMINATE RENTAL SESSION.
1122

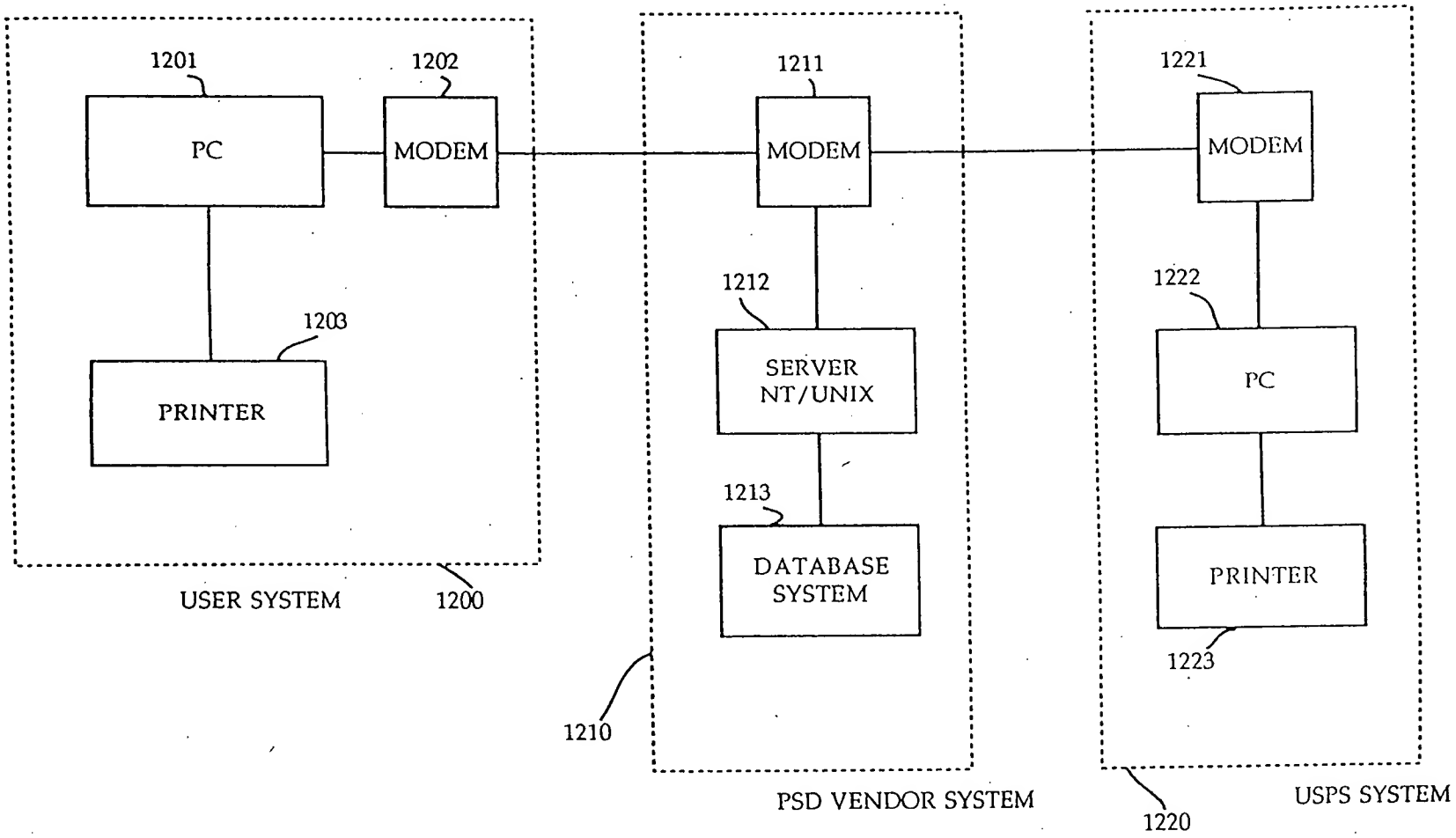

1201
1202
1211
1221
PC
MODEM
MODEM
MODEM
1212
1222
1203
SERVER
NT/UNIX
PC
PRINTER
1213
DATABASE
SYSTEM
PRINTER
1223
1210
USER SYSTEM
1200
PSD VENDOR SYSTEM
1220
USPS SYSTEM

FIGURE 12

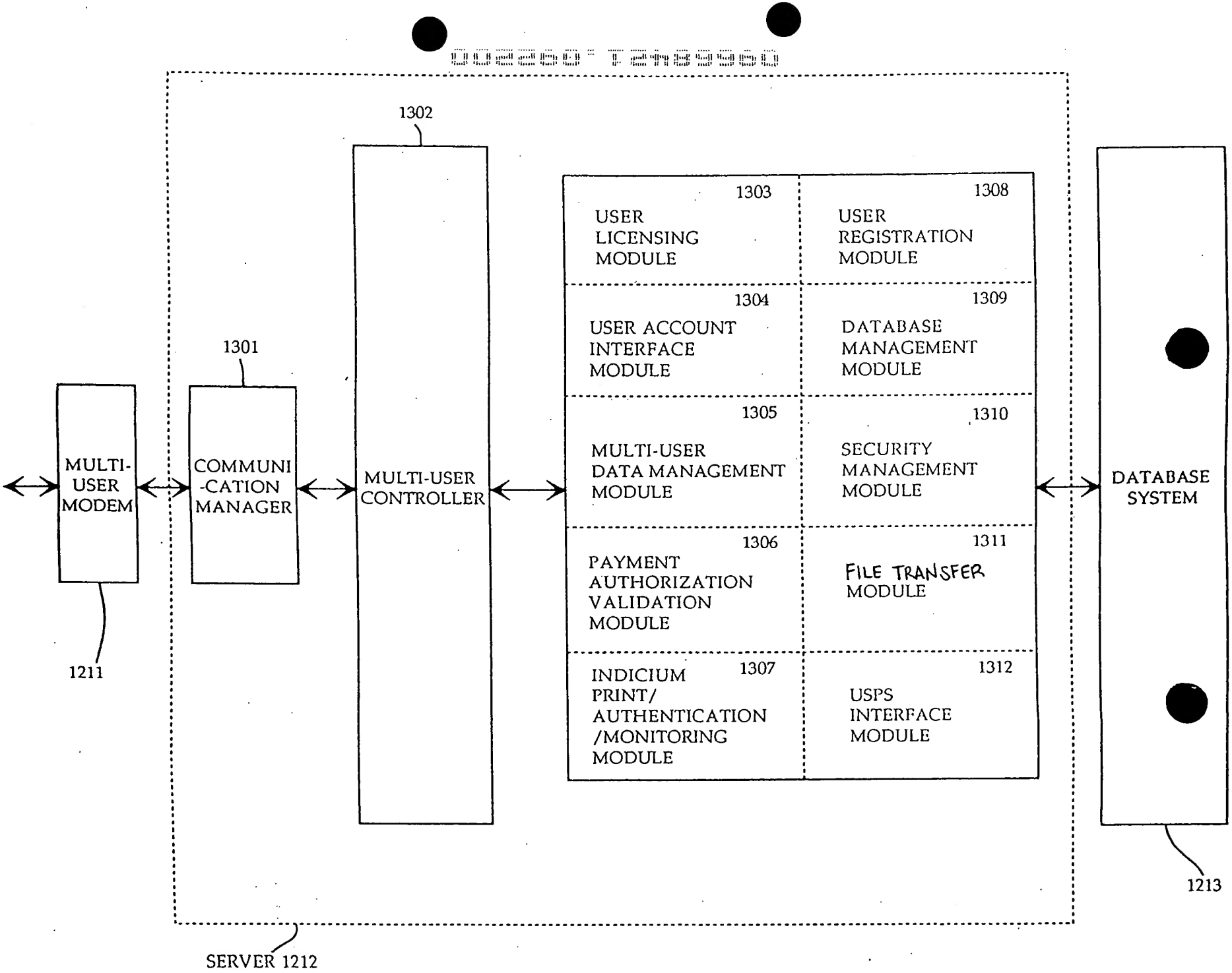

1302
1303
USER LICENSING MODULE
1308
USER REGISTRATION MODULE
1304
USER ACCOUNT INTERFACE MODULE
1309
DATABASE MANAGEMENT MODULE
1301
1305
MULTI-USER DATA MANAGEMENT MODULE
1310
SECURITY MANAGEMENT MODULE
MULTI-USER MODEM
COMMUNI-CATION MANAGER
MULTI-USER CONTROLLER
DATABASE SYSTEM
1306
PAYMENT AUTHORIZATION VALIDATION MODULE
1311
FILE TRANSFER MODULE
1307
INDICIUM PRINT/ AUTHENTICATION /MONITORING MODULE
1312
USPS INTERFACE MODULE
1211
1213
SERVER 1212

FIGURE 13

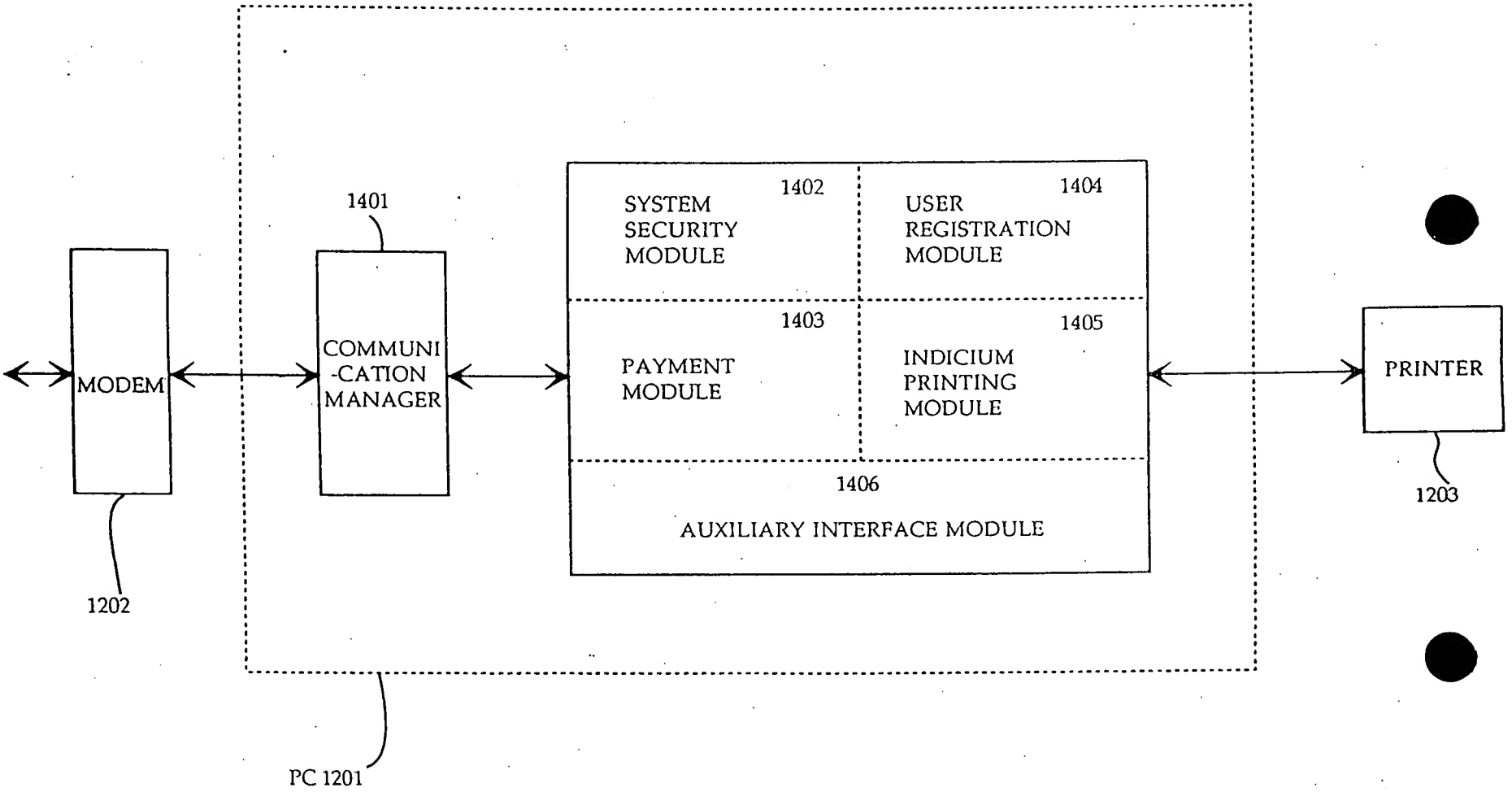

1401
SYSTEM SECURITY MODULE
1402
USER REGISTRATION MODULE
1404
PAYMENT MODULE
1403
INDICIUM PRINTING MODULE
1405
1406
AUXILIARY INTERFACE MODULE
MODEM
COMMUNI -CATION MANAGER
PRINTER
1202
1203
PC 1201

FIGURE 14

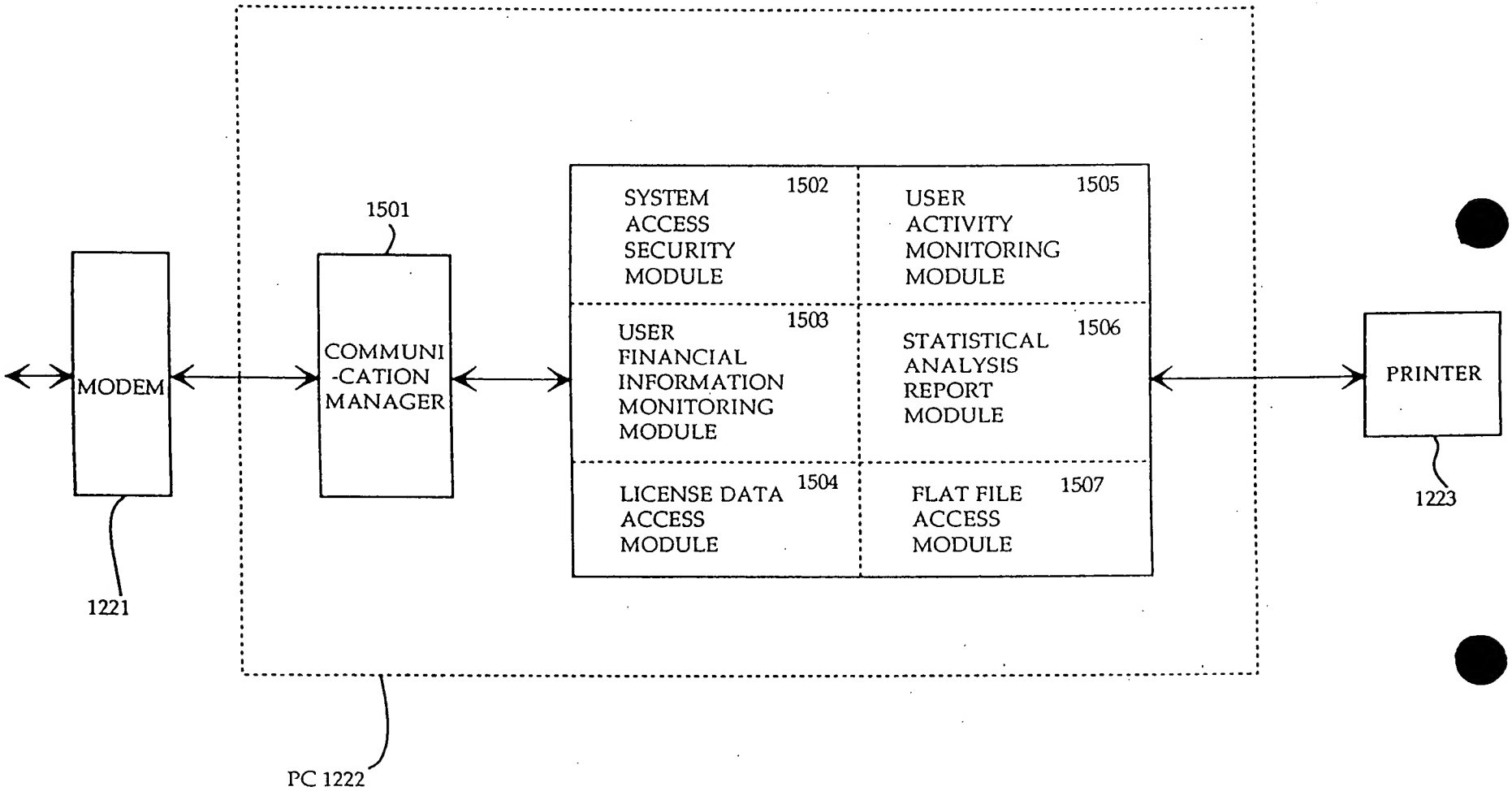

1501
MODEM
COMMUNI
-CATION
MANAGER
1221
SYSTEM
ACCESS
SECURITY
MODULE
1502
USER
ACTIVITY
MONITORING
MODULE
1505
USER
FINANCIAL
INFORMATION
MONITORING
MODULE
1503
STATISTICAL
ANALYSIS
REPORT
MODULE
1506
LICENSE DATA
ACCESS
MODULE
1504
FLAT FILE
ACCESS
MODULE
1507
PRINTER
1223
PC 1222

FIGURE 15

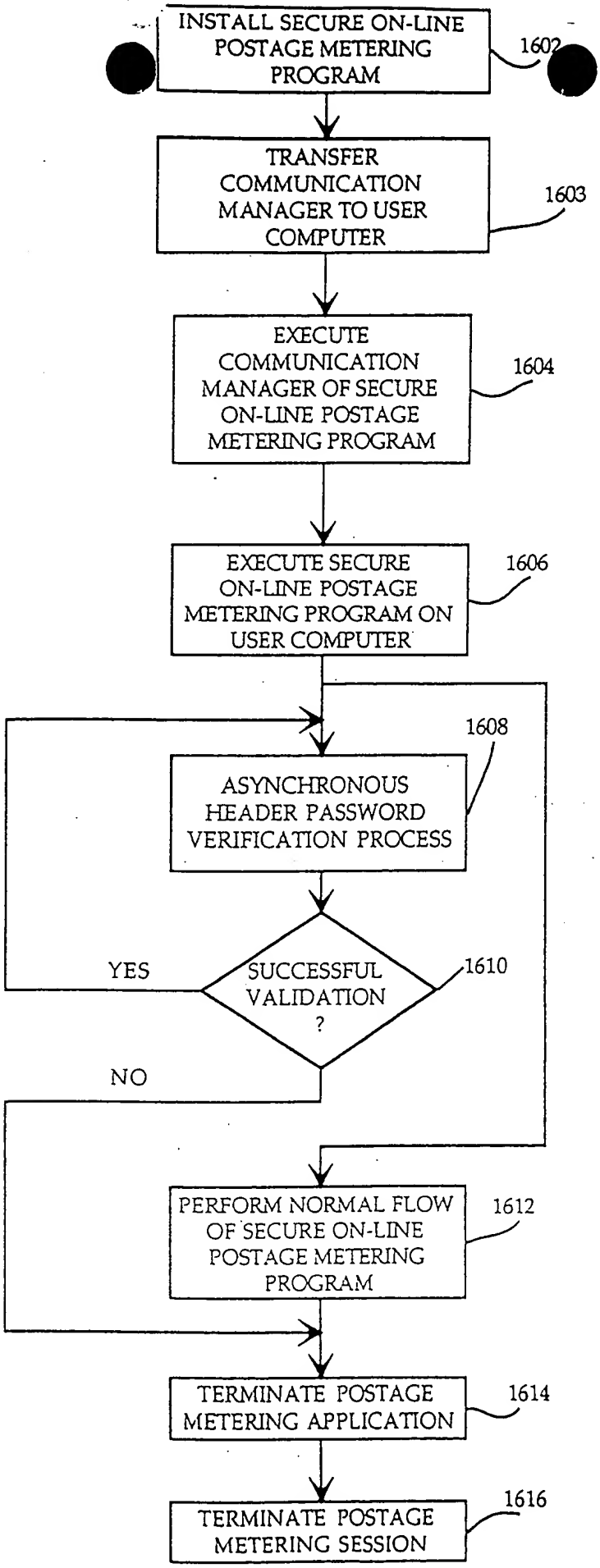

INSTALL SECURE ON-LINE POSTAGE METERING PROGRAM
1602
TRANSFER COMMUNICATION MANAGER TO USER COMPUTER
1603
EXECUTE COMMUNICATION MANAGER OF SECURE ON-LINE POSTAGE METERING PROGRAM
1604
EXECUTE SECURE ON-LINE POSTAGE METERING PROGRAM ON USER COMPUTER
1606
1608
ASYNCHRONOUS HEADER PASSWORD VERIFICATION PROCESS
YES
SUCCESSFUL VALIDATION ?
1610
NO
PERFORM NORMAL FLOW OF SECURE ON-LINE POSTAGE METERING PROGRAM
1612
TERMINATE POSTAGE METERING APPLICATION
1614
TERMINATE POSTAGE METERING SESSION
1616

FIGURE 16

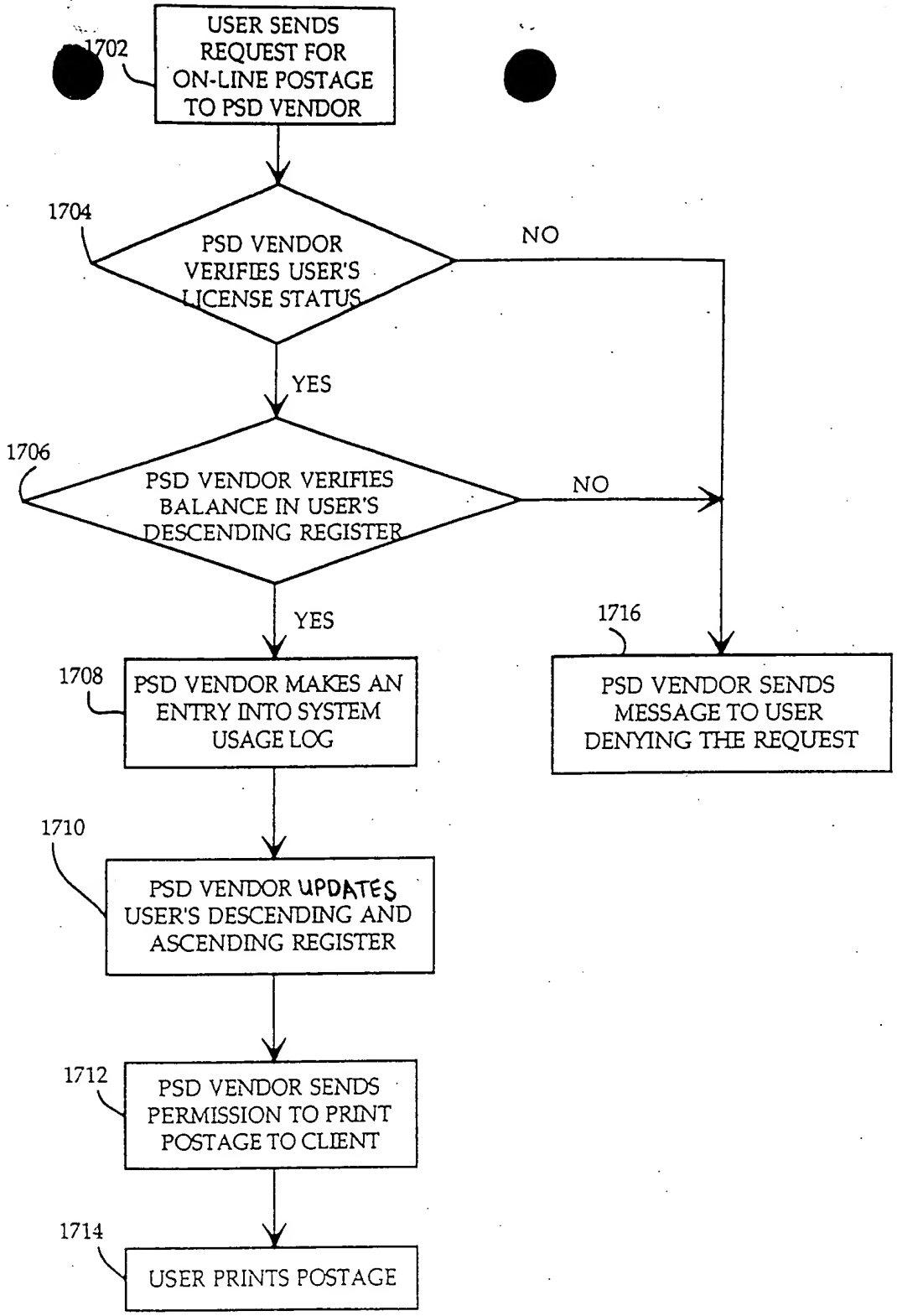

1702
USER SENDS REQUEST FOR ON-LINE POSTAGE TO PSD VENDOR
1704
PSD VENDOR VERIFIES USER'S LICENSE STATUS
NO
YES
1706
PSD VENDOR VERIFIES BALANCE IN USER'S DESCENDING REGISTER
NO
YES
1716
PSD VENDOR SENDS MESSAGE TO USER DENYING THE REQUEST
1708
PSD VENDOR MAKES AN ENTRY INTO SYSTEM USAGE LOG
1710
PSD VENDOR UPDATES USER'S DESCENDING AND ASCENDING REGISTER
1712
PSD VENDOR SENDS PERMISSION TO PRINT POSTAGE TO CLIENT
1714
USER PRINTS POSTAGE

FIGURE 17

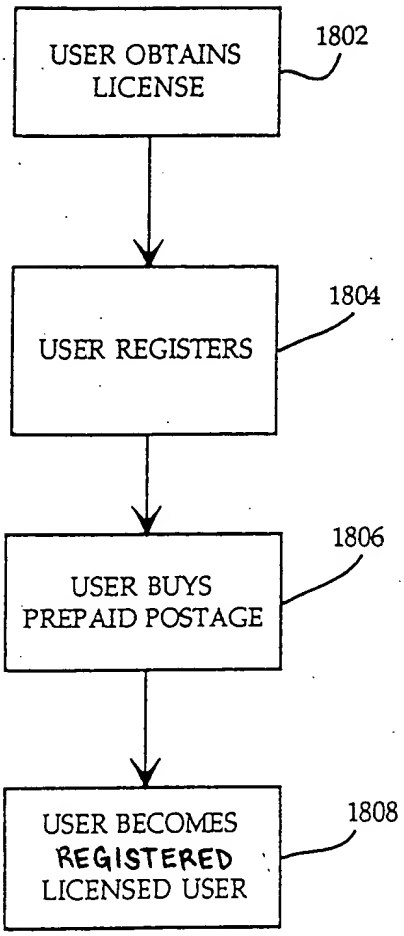

USER OBTAINS LICENSE
1802
USER REGISTERS
1804
USER BUYS PREPAID POSTAGE
1806
USER BECOMES REGISTERED LICENSED USER
1808

FIGURE 18

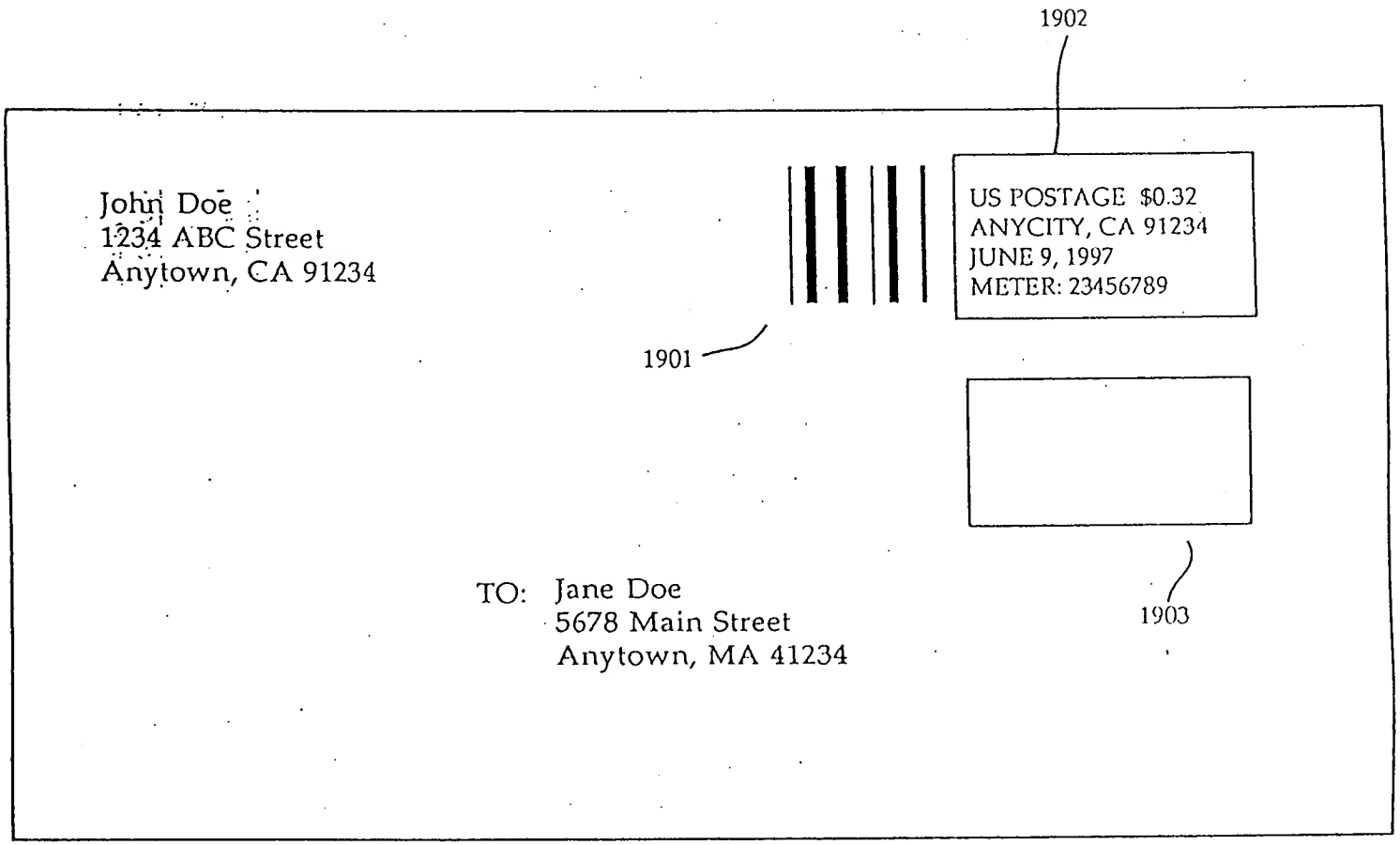
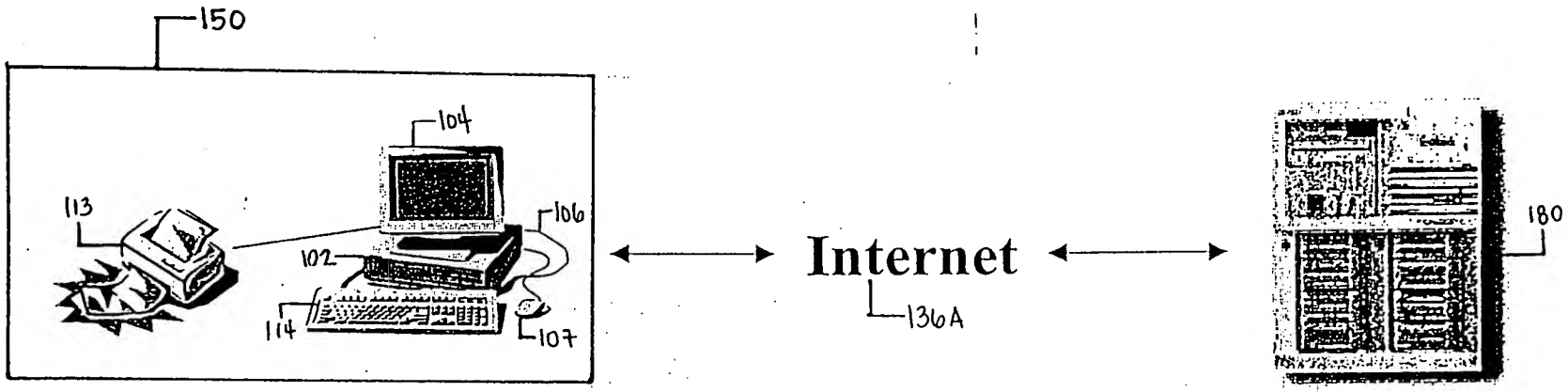

1902
John Doe
1234 ABC Street
Anytown, CA 91234
US POSTAGE $0.32
ANYCITY, CA 91234
JUNE 9, 1997
METER: 23456789
1901
1903
TO: Jane Doe
5678 Main Street
Anytown, MA 41234

FIGURE 19




Client

Server

FIGURE 20

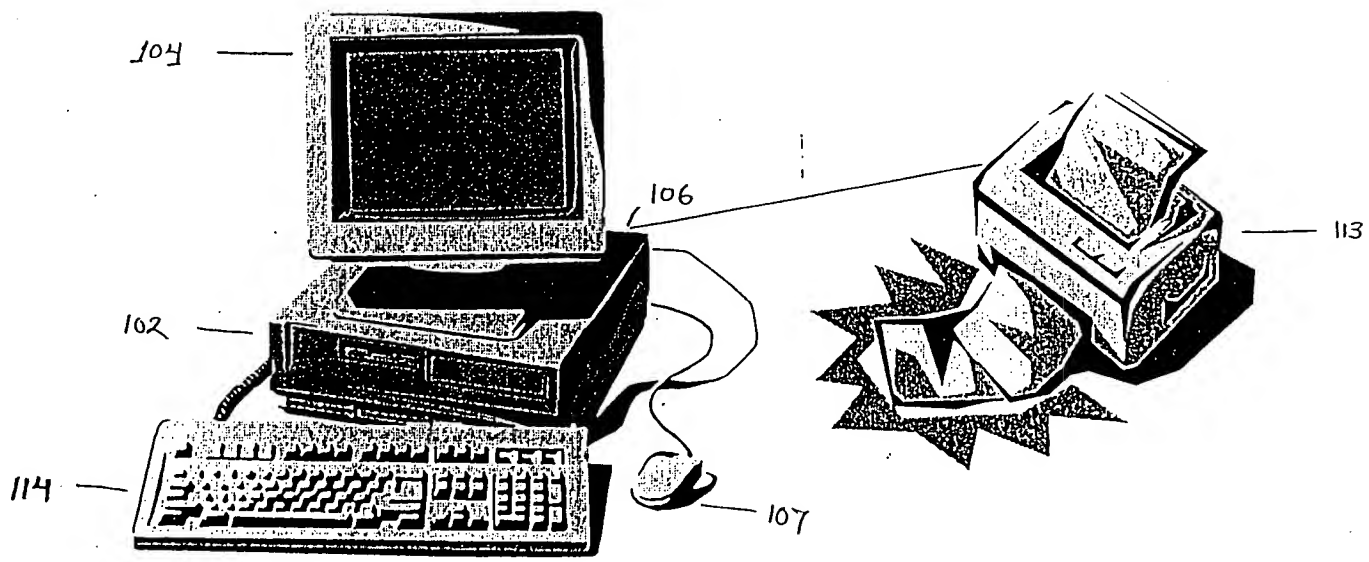



FIGURE 21

FIGURE 22

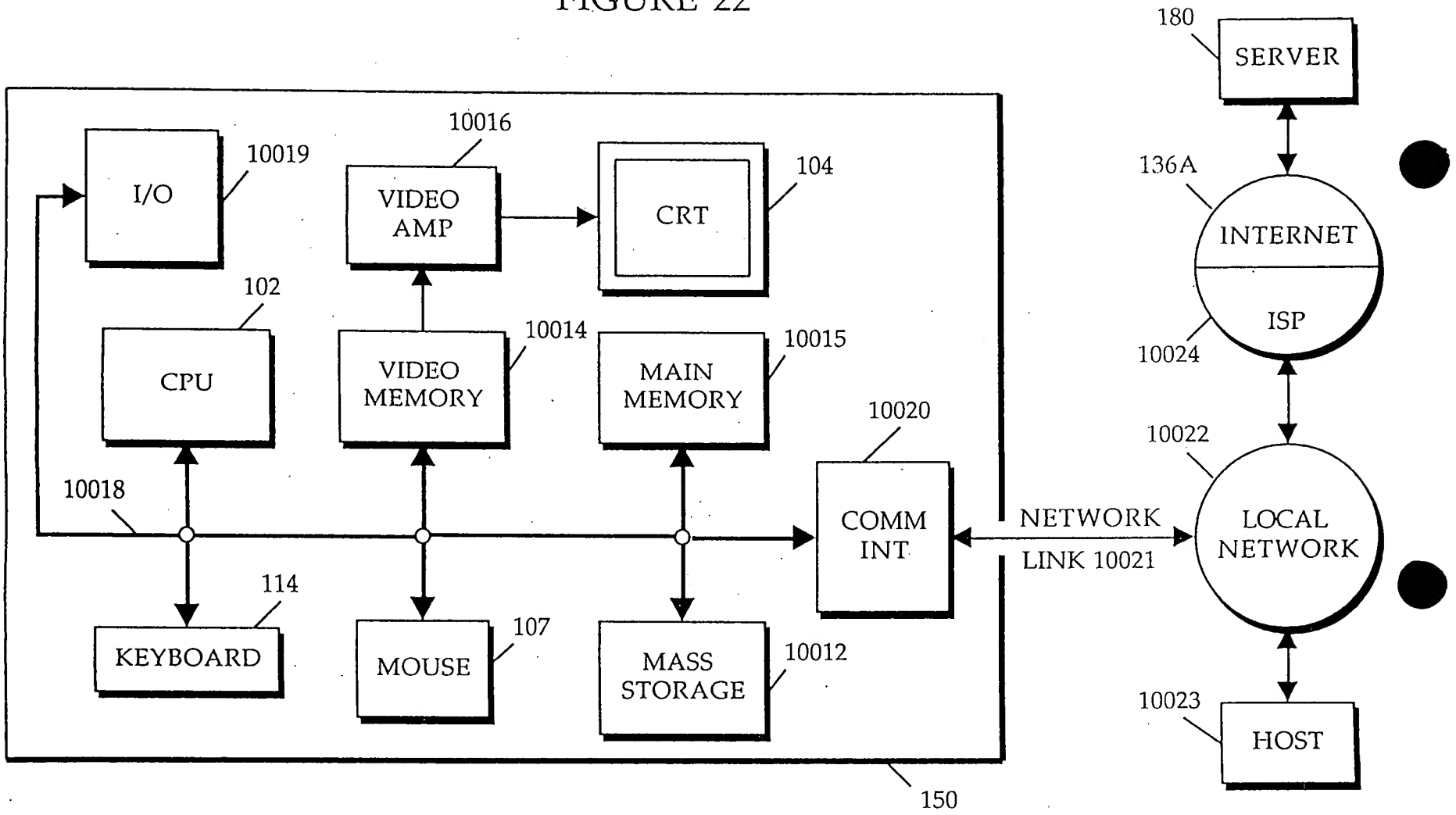

I/O
10019
10016
VIDEO AMP
CRT
104
102
CPU
VIDEO MEMORY
10014
MAIN MEMORY
10015
10020
10018
COMM INT
NETWORK LINK 10021
114
KEYBOARD
MOUSE
107
MASS STORAGE
10012
150
180
SERVER
136A
INTERNET
ISP
10024
10022
LOCAL NETWORK
10023
HOST

FIGURE 23

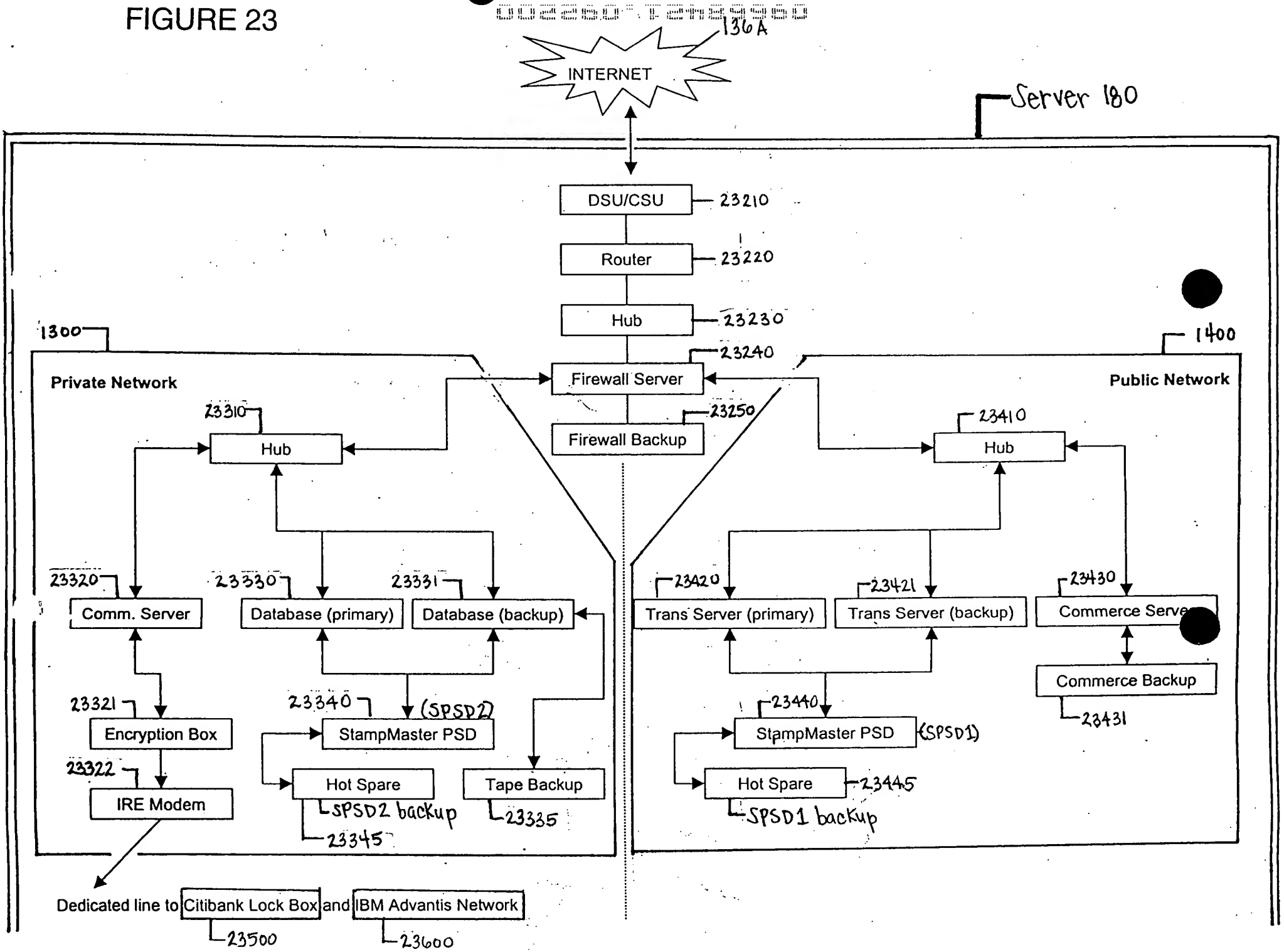
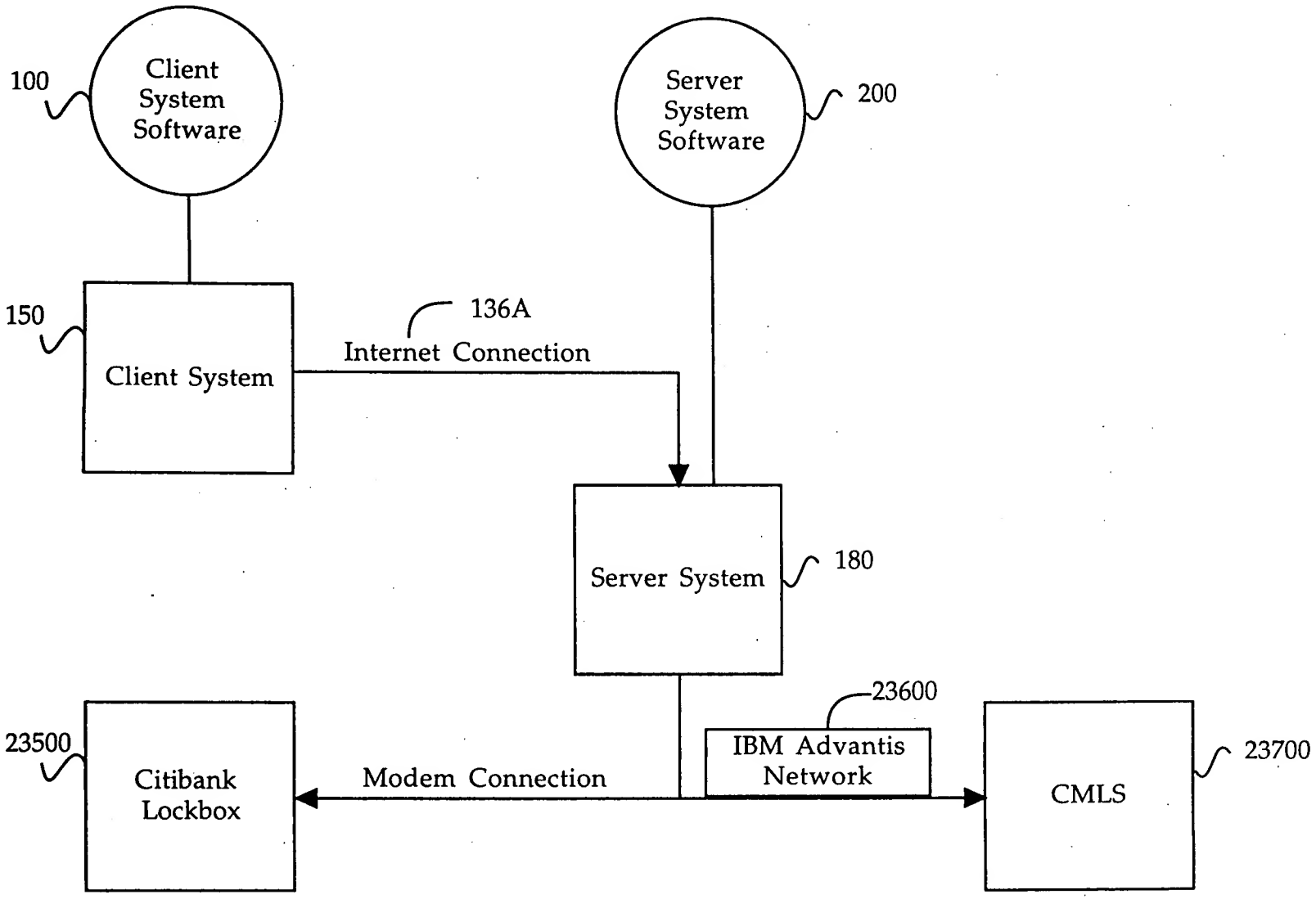

136A
INTERNET
Server 180
DSU/CSU
23210
Router
23220
Hub
23230
1300
1400
23240
Firewall Server
Private Network
Public Network
23250
Firewall Backup
23310
Hub
23410
Hub
23320
23330
23331
23420
23421
23430
Comm. Server
Database (primary)
Database (backup)
Trans Server (primary)
Trans Server (backup)
Commerce Server
Commerce Backup
23431
23321
Encryption Box
23322
IRE Modem
23340
(SPSD2)
StampMaster PSD
Hot Spare
SPSD2 backup
23345
Tape Backup
23335
23440
StampMaster PSD
(SPSD1)
Hot Spare
23445
SPSD1 backup
Dedicated line to
Citibank Lock Box
23500
and
IBM Advantis Network
23600

FIGURE 24


100
Client System Software
200
Server System Software
150
Client System
136A
Internet Connection
Server System
180
23600
IBM Advantis Network
23500
Citibank Lockbox
Modem Connection
CMLS
23700

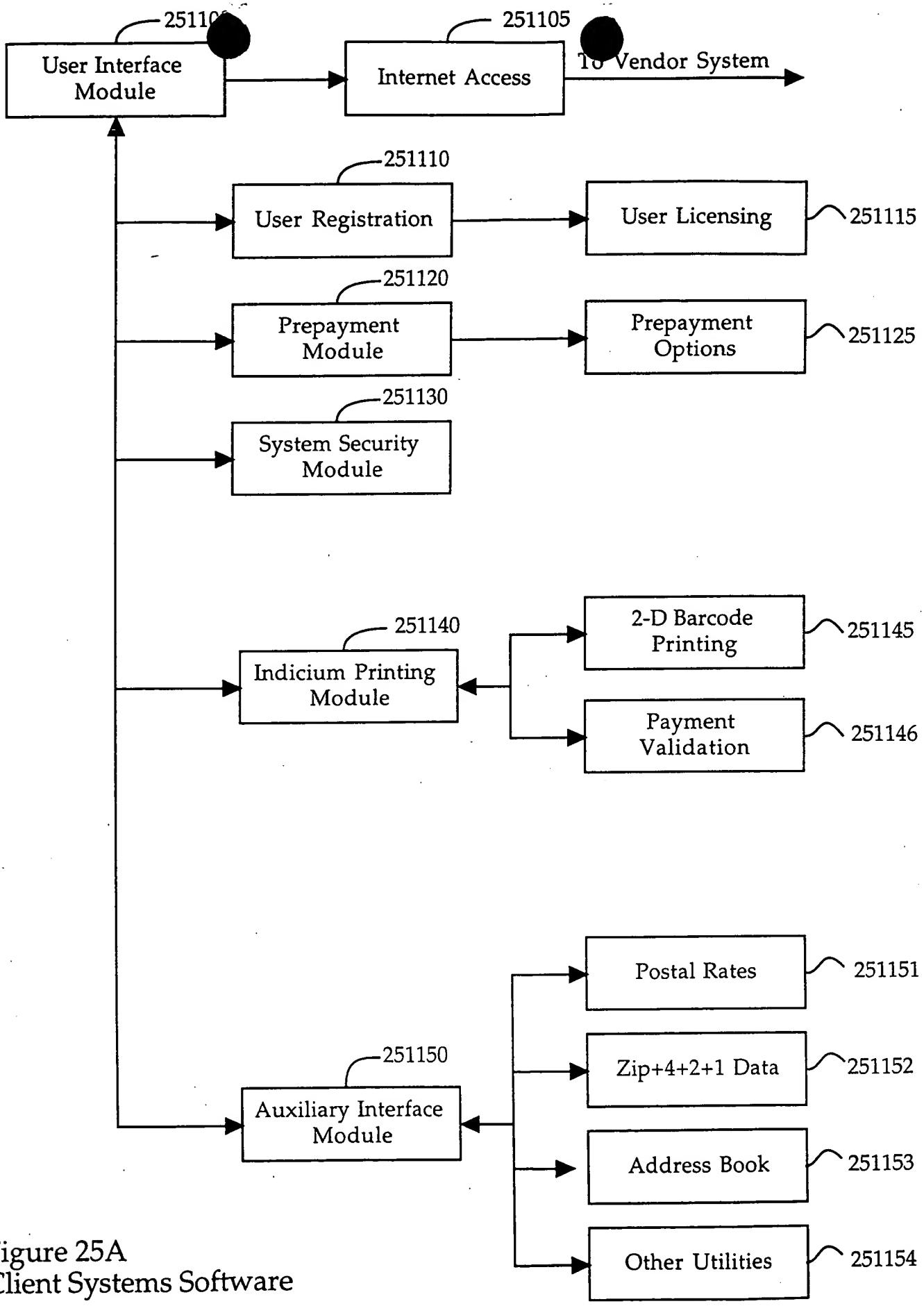



Figure 25A
Client Systems Software

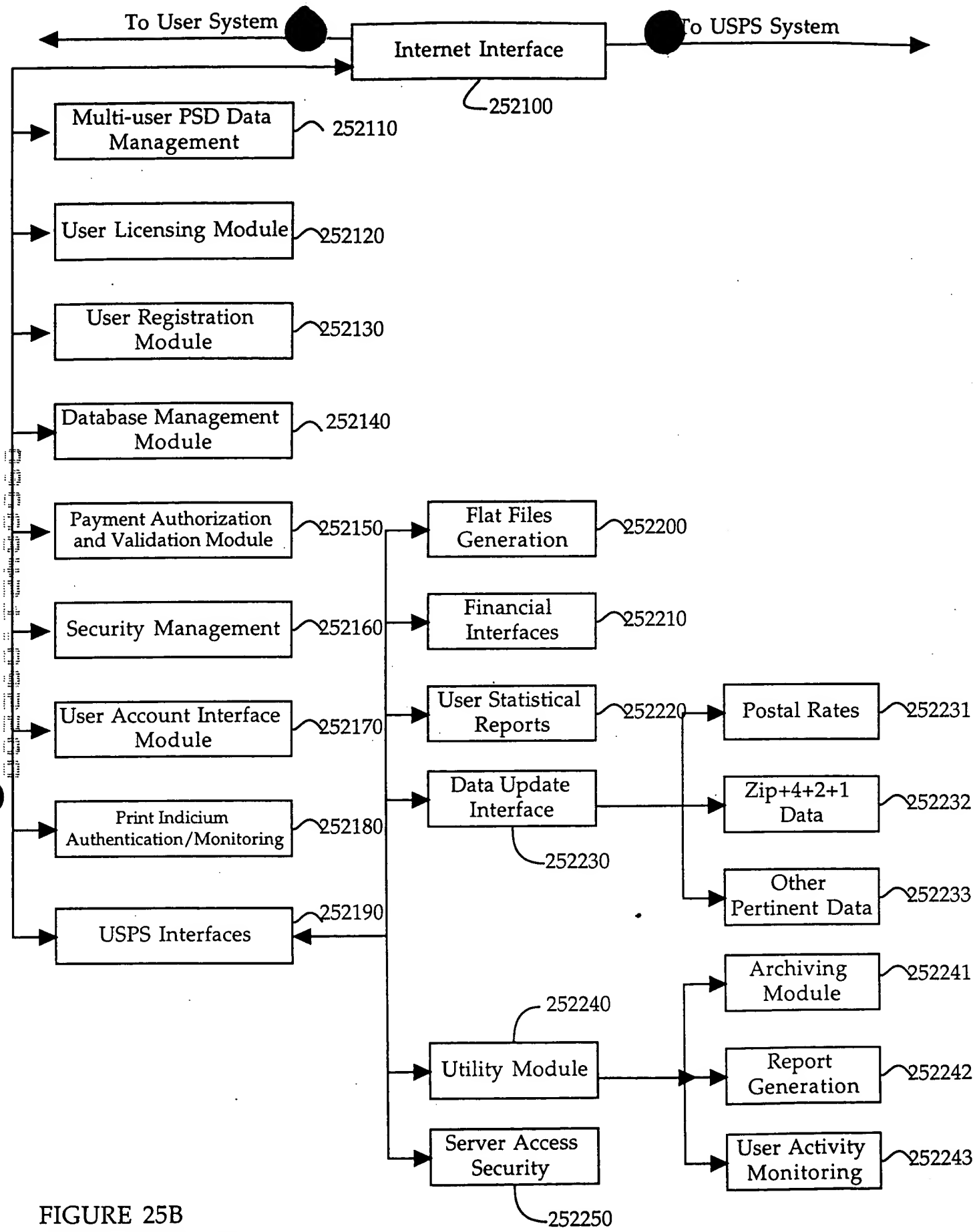



FIGURE 25B
Server System Software

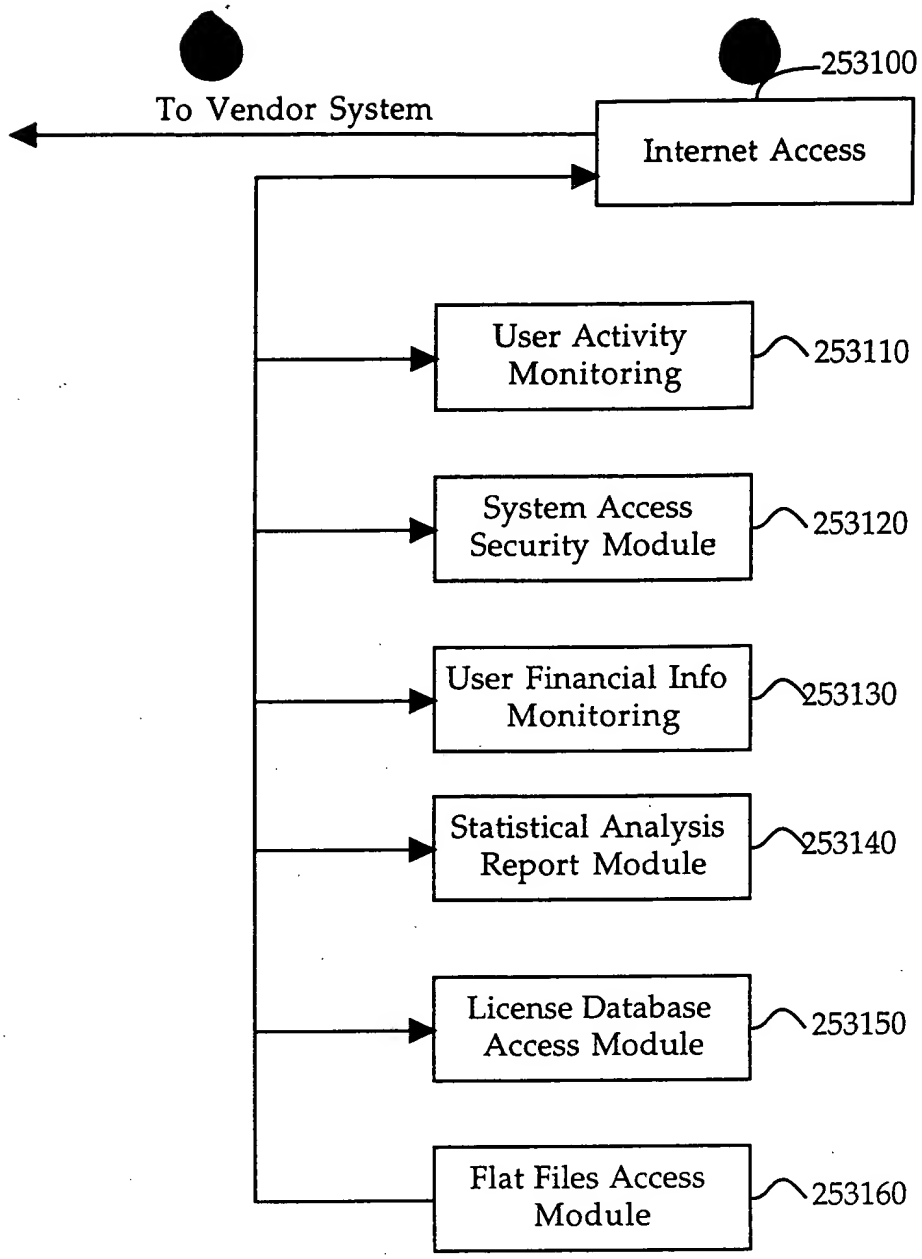



**Figure 25C**
**Administrator System Software**

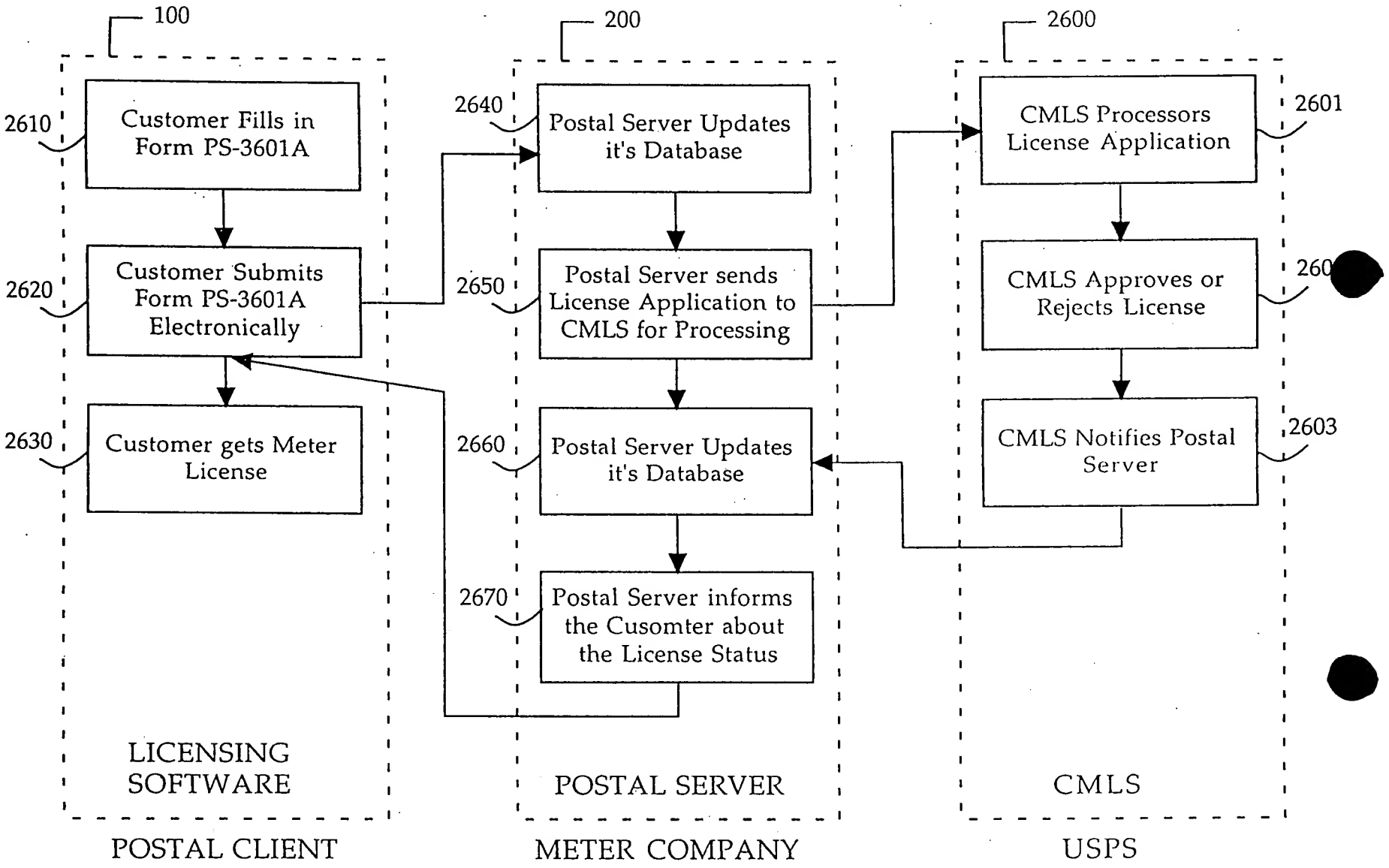

100
200
2600
2610
Customer Fills in Form PS-3601A
2620
Customer Submits Form PS-3601A Electronically
2630
Customer gets Meter License
2640
Postal Server Updates it's Database
2650
Postal Server sends License Application to CMLS for Processing
2660
Postal Server Updates it's Database
2670
Postal Server informs the Cusomter about the License Status
2601
CMLS Processors License Application
CMLS Approves or Rejects License
2603
CMLS Notifies Postal Server
LICENSING SOFTWARE
POSTAL SERVER
CMLS
POSTAL CLIENT
METER COMPANY
USPS

FIGURE 26

FIGURE 27

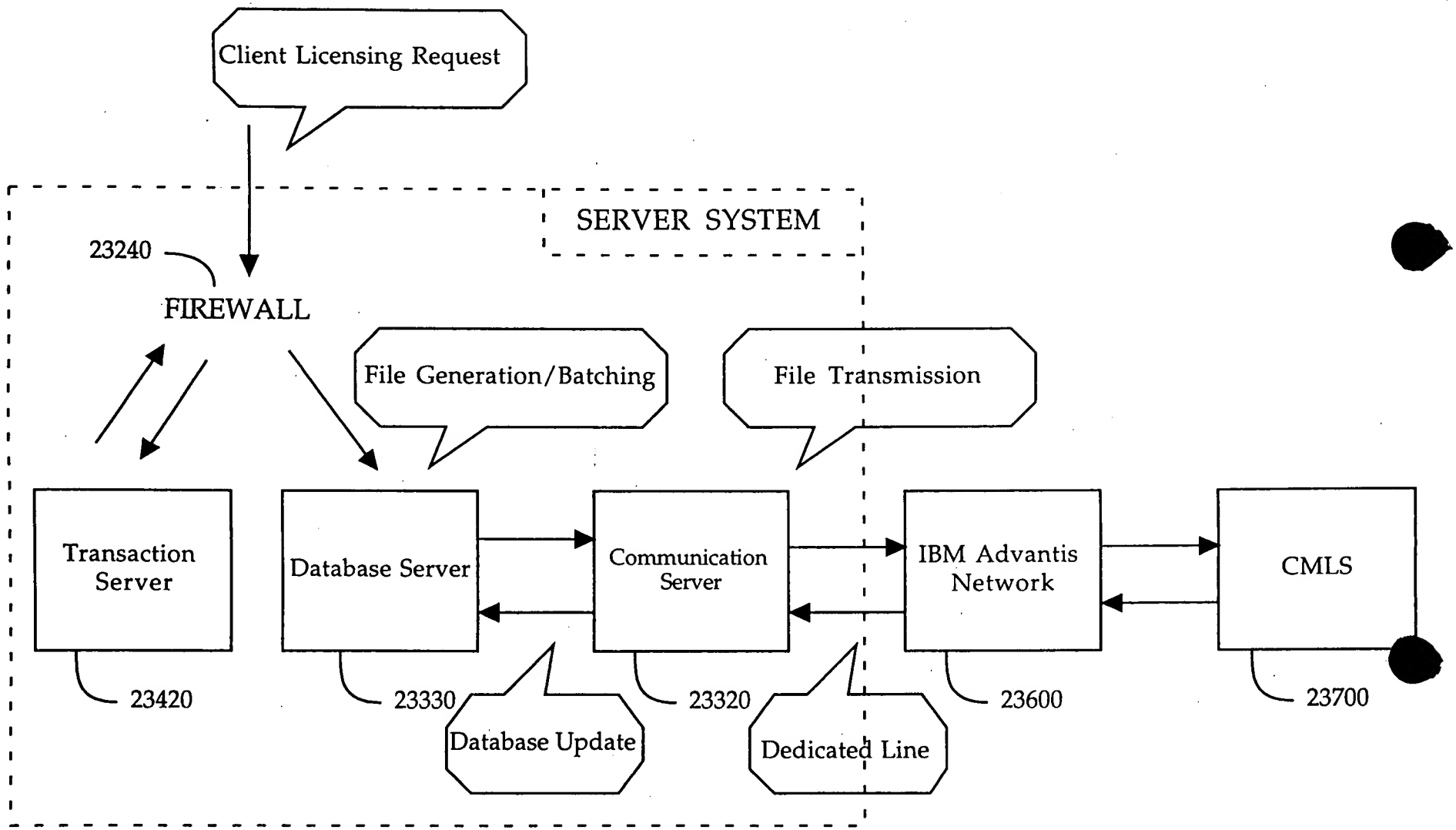

Client Licensing Request
SERVER SYSTEM
23240
FIREWALL
File Generation/Batching
File Transmission
Transaction Server
Database Server
Communication Server
IBM Advantis Network
CMLS
23420
23330
23320
23600
23700
Database Update
Dedicated Line

FIGURE 28

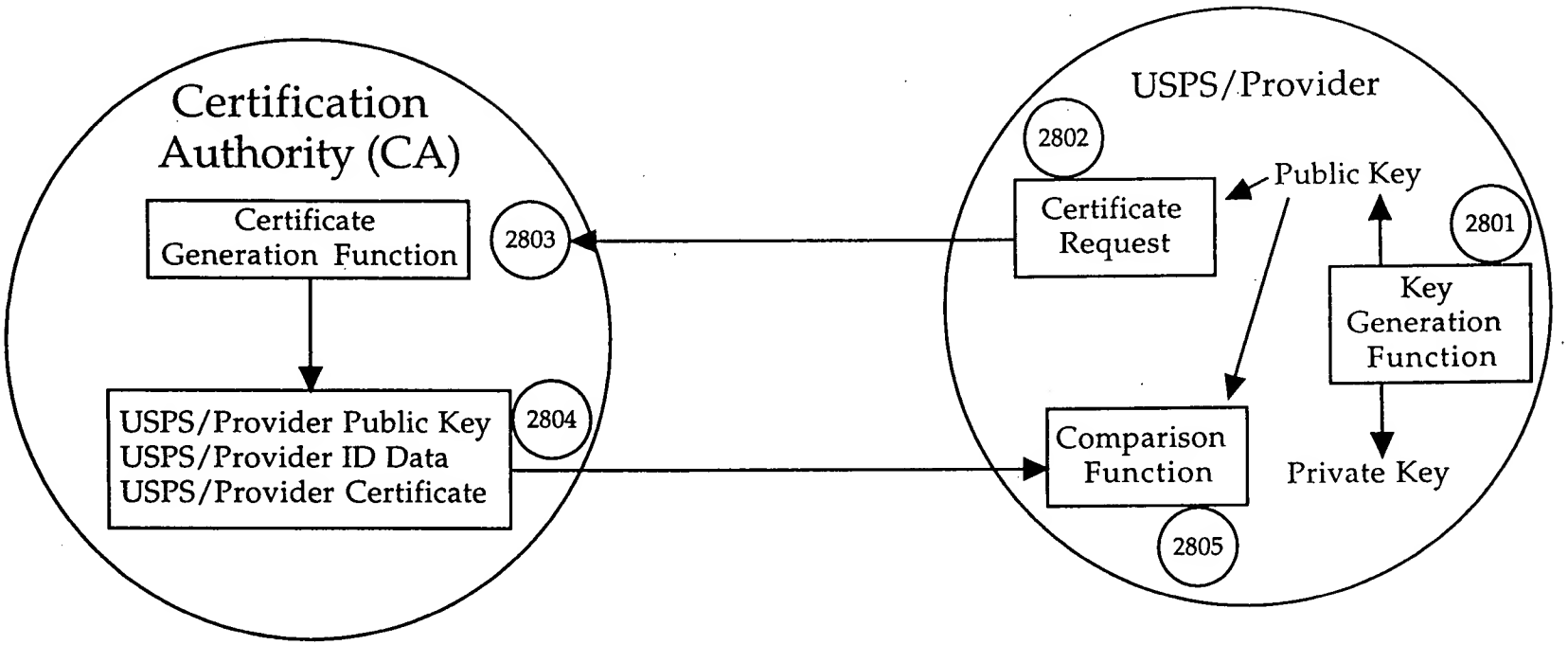
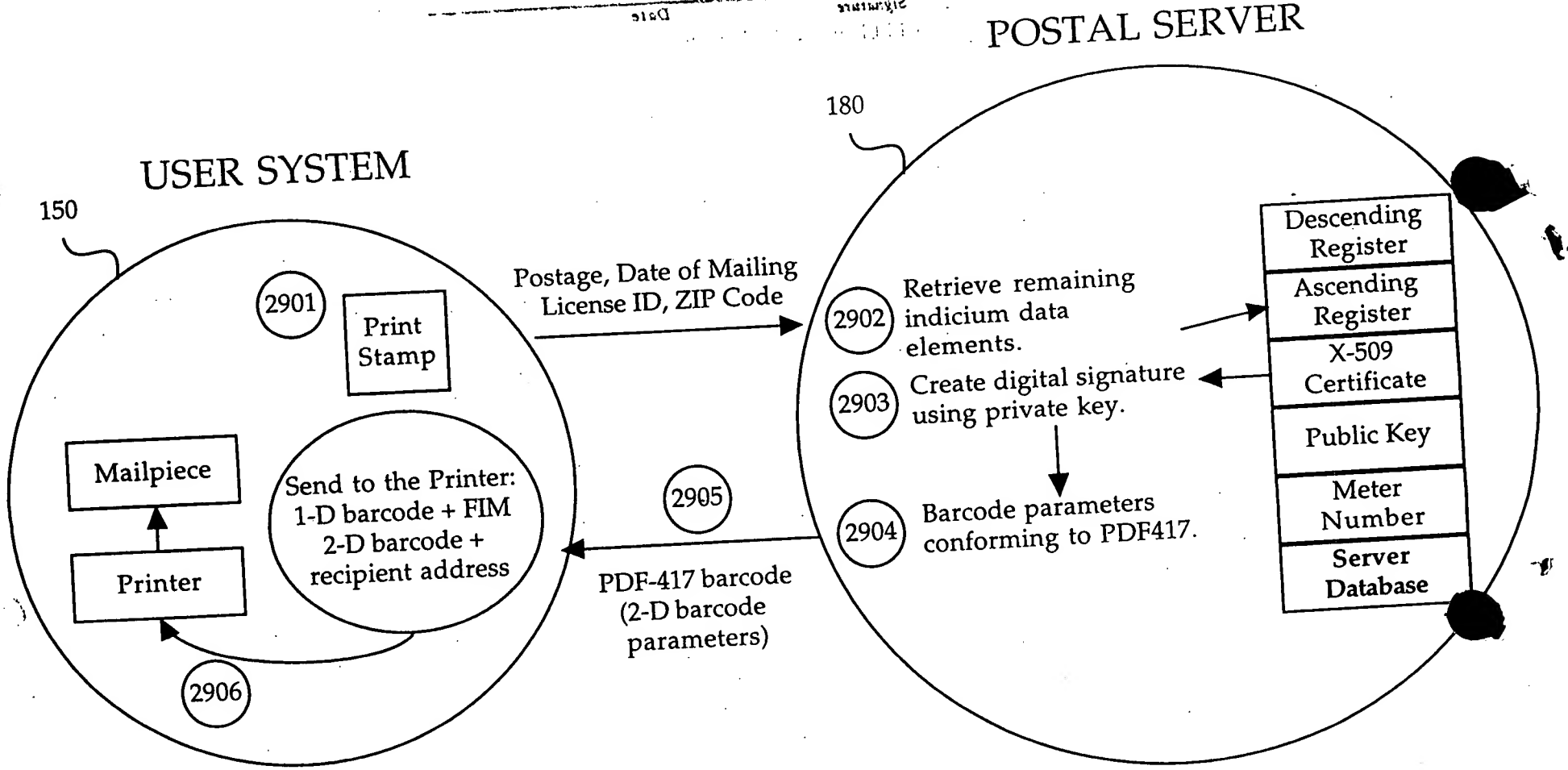

Certification Authority (CA)
Certificate Generation Function
2803
USPS/Provider Public Key
USPS/Provider ID Data
USPS/Provider Certificate
2804
USPS/Provider
2802
Certificate Request
Public Key
2801
Key Generation Function
Comparison Function
Private Key
2805

FIGURE 29


USER SYSTEM
150
2901
Print Stamp
Mailpiece
Printer
Send to the Printer:
1-D barcode + FIM
2-D barcode +
recipient address
2906
Postage, Date of Mailing
License ID, ZIP Code
2905
PDF-417 barcode
(2-D barcode
parameters)
POSTAL SERVER
180
2902
Retrieve remaining
indicium data
elements.
2903
Create digital signature
using private key.
2904
Barcode parameters
conforming to PDF417.
Descending Register
Ascending Register
X-509 Certificate
Public Key
Meter Number
Server Database